



Search Report

EIC 1700

STIC Database Tracking Number: 240510

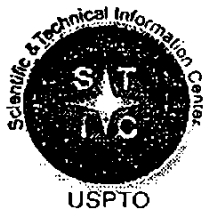
To: EUGENIA WANG
Location: REM-6C61
Art Unit: 1795
Wednesday, October 24, 2007

Case Serial Number: 10/550709

From: KATHLEEN FULLER
Location: EIC1700
REM-4B28 / REM-4B19
Phone: (571)272-2505

kathleen.fuller@uspto.gov

Search Notes



STIC Search Results Feedback Form

EIC17000

Questions about the scope or the results of the search? Contact *the EIC searcher* or contact:

Kathleen Fuller, EIC 1700 Team Leader
571/272-2505 REMSEN 4B28

Voluntary Results Feedback Form

- I am an examiner in Workgroup: Example: 1713
➤ Relevant prior art **found**, search results used as follows:

- ☐ 102 rejection
- ☐ 103 rejection
- ☐ Cited as being of interest.
- ☐ Helped examiner better understand the invention.
- ☐ Helped examiner better understand the state of the art in their technology.

Types of relevant prior art found:

- ☐ Foreign Patent(s)
- ☐ Non-Patent Literature
(journal articles, conference proceedings, new product announcements etc.)

➤ Relevant prior art **not found**:

- ☐ Results verified the lack of relevant prior art (helped determine patentability).
- ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

Drop off or send completed forms to EIC1700 REMSEN 4B28

Anekwe, Imelda (ASRC)

240510

From: EUGENIA WANG [eugenia.wang@uspto.gov]
Sent: Wednesday, October 17, 2007 10:35 AM
To: STIC-EIC1700
Subject: Database Search Request, Serial Number: 10550709

Requester: EUGENIA WANG (P/1745)
Art Unit: GROUP ART UNIT 1745
Employee Number: 82927
Office Location: REM 06C61
Phone Number: (571)272-4942
Mailbox Number:

SCIENTIFIC REFERENCE BR
Sci & Tech Inf. Ctr.

OCT 17

Pat. & T.M. Office

Case serial number: 10550709
Class / Subclass(es): 429, 252, 502, 423, 428
Earliest Priority Filing Date: 3/26/03
Format preferred for results: Paper
Attachments: No attachment.
Search Topic Information:

The inventive concept of this invention is a carbon sheet having a large range of pore sizes, wherein they control the volume of the pores with a certain size. (Claim 1 - controls the pore volume corresponding with pore sizes 10 microns or less to 0.05 to 0.16 cc/g. Claim 14 - shows that the pore range is large, as the peak pore size is 25 to 55 microns.) When searching for "pore volume" also try the units "cc/g" or "mL/g." Some synonyms for the word "pore" would be porosity, orifice, aperture, hole. Although the independent claim is not limited to a fuel cell, please try a search that limits it to a fuel cell or membrane electrode assembly (MEA).

Special Instructions and Other Comments:

SECRET

—



PA (TORA-C) TORAY IND INC

CYC 1

PI JP 2007176750 A 20070712 (200766)* JA 16[3]

ADT JP 2007176750 A JP 2005-377518 20051228

PRAI JP 2005-377518 20051228

IPCI C04B0035-83 [I,A]; C04B0035-83 [I,C];

H01M0004-88 [I,A]; H01M0004-88 [I,C];

H01M0004-96 [I,A]; H01M0004-96 [I,C]

AB JP 2007176750 A UPAB: 20071015

NOVELTY - A porous carbon fiber sheet is a sheet article having a porous structure containing carbon fiber. The porous carbon fiber sheet has compression residual distortion of both surfaces of 3-10 microns and compressive deformation rate during pressurization of 13-30%.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for manufacture of porous carbon fiber sheet.

USE - As material of gaseous diffusion component of polymer electrolyte fuel cell and direct methanol fuel cell for motor vehicles, and for electrode base material and electrode of dehydrators.

ADVANTAGE - The porous carbon fiber sheet has high compressive deformation rate, small compressive residual distortion, high electroconductivity and high mechanical characteristics.

DESCRIPTION OF DRAWINGS - The figure shows compression process in manufacture of porous carbon base sheet.

Precursor fiber sheet with high bulk density (1)

Precursor fiber sheet with low bulk density (2)

TECH INORGANIC CHEMISTRY - Preferred Properties: The porous carbon fiber sheet has bulk density (Da) of region of thickness from surface of both surfaces to 50 microns of 0.4-0.6 g/cm³. The ratio of bulk density (Da) and bulk density (Db) of region of 20 microns of thickness direction center section of porous carbon fiber sheet is more than 1 and less than 6. The porous carbon fiber sheet has electrical resistance of 1-8 m Ω cm² along thickness direction, bending strength of 10-100 MPa and thickness of 120-400 microns. The porous carbon fiber sheet has porous structure of two layers or more having different bulk density along thickness direction. The density of porous structure of both surfaces is higher than bulk density of internal porous structure. The porous carbon fiber sheet has symmetrical structure as center of thickness direction. Preferred Sheet: The porous carbon fiber sheet contains carbon short fiber and resin carbide which are dispersed, such that at least one portion of carbon short fiber is bonded with the resin carbide.

FS CPI; EPI

MC CPI: A12-E06; E31-N01; L03-E04A2; L03-E04B

EPI: X16-C01C; X16-E06A5E; X21-A01J; X21-B01A; X22-P04A

L47 ANSWER 2 OF 8 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

AN 2004-728753 [71] WPIX

DNC C2004-256164 [71]

DNN N2004-577138 [71]

TI Porous carbon base material for gaseous diffusion material, comprises sheet containing carbon short fiber bound by carbonized resin, and has preset pore volume

DC A85; L03; X16

IN CHIDA T; INOUE M; ISOI S; OKADA K; SENDA T

PA (TORA-C) TORAY IND INC; (CHID-I) CHIDA T; (INOUE-I) INOUE M; (ISOI-I) ISOI S; (OKAD-I) OKADA K

application

CYC 107

PI WO 2004085728 A1 20041007 (200471)* JA 63[9]
 JP 2004308098 A 20041104 (200472) JA 18
 JP 2004311431 A 20041104 (200472) JA 15
 EP 1612313 A1 20060104 (200603) EN
 JP 2006143478 A 20060608 (200638) JA 20
 CN 1764752 A 20060426 (200654) ZH
 US 20060180798 A1 20060817 (200655) EN
 KR 2005116153 A 20051209 (200668) KO

ADT WO 2004085728 A1 WO 2004-JP4158 20040325; JP 2006143478 A JP 2003-334743
 20030926; CN 1764752 A CN 2004-80008038 20040325; EP 1612313 A1 EP
 2004-723333 20040325; JP 2004308098 A JP 2004-88794 20040325; EP 1612313
 A1 WO 2004-JP4158 20040325; US 20060180798 A1 WO 2004-JP4158 20040325; JP
 2004311431 A JP 2004-91313 20040326; US 20060180798 A1 US 2005-550709
 20050926; KR 2005116153 A WO 2004-JP4158 20040325; KR 2005116153 A KR
 2005-717818 20050923

FDT EP 1612313 A1 Based on WO 2004085728 A; KR 2005116153 A Based on
 WO 2004085728 A

PRAI JP 2003-334743 20030926
 JP 2003-84644 20030326
 JP 2003-87223 20030327

IC ICM H01M004-96

IPCI C04B0035-83 [I,A]; C04B0035-83 [I,C]; D04H0001-42
 [I,A]; D04H0001-42 [I,C]; H01B0001-04 [I,A]; H01B0001-04 [I,C];
 H01M0004-94 [I,A]; H01M0004-94 [I,C];
 H01M0004-96 [I,A]; H01M0004-96 [I,A];
 H01M0004-96 [I,C]; H01M0004-96 [I,C];
 H01M0008-02 [I,A]; H01M0008-02 [I,C];
 H01M0008-10 [I,A]; H01M0008-10 [I,C]

IPCR C04B0035-83 [I,A]; C04B0035-83 [I,A];
 C04B0035-83 [I,C]; C04B0035-83 [I,C]; D01F0009-14 [I,C];
 D01F0009-22 [I,A]; D04H0001-42 [I,A]; D04H0001-42 [I,A]; D04H0001-42
 [I,C]; D04H0001-42 [I,C]; D04H0001-64 [I,A]; D04H0001-64 [I,C];
 D06C0015-00 [I,C]; D06C0015-02 [I,A]; D06C0009-00 [I,C]; D06C0009-04
 [I,A]; D06M0011-00 [I,C]; D06M0011-74 [I,A]; H01M0004-86 [I,A];
 H01M0004-86 [I,C]; H01M0004-88 [I,A];
 H01M0004-88 [I,C]; H01M0004-90 [N,C];
 H01M0004-92 [N,A]; H01M0004-96 [I,A];
 H01M0004-96 [I,A]; H01M0004-96 [I,C];
 H01M0004-96 [I,C]; H01M0008-10 [I,A];
 H01M0008-10 [I,A]; H01M0008-10 [I,C];
 H01M0008-10 [I,C]

AB WO 2004085728 A1 UPAB: 20050707

NOVELTY - The porous carbon base material comprises
 sheet containing carbon short fiber dispersed randomly and
 carbonized resin. The carbon short fibers are bound by the carbonized
 resin. The pore volume of the base material having
 pore diameter of 10 microns or less is 0.05-0.16 cc/g.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the
 following:

- (1) gaseous diffusion material;
- (2) film electrode conjugant;
- (3) fuel cell; and
- (4) manufacture of porous carbon base material.

USE - For gaseous diffusion material, film electrode conjugant and
 fuel cell (all claimed) especially polymer electrolyte
 fuel cell.

ADVANTAGE - The porous carbon base material
 having favorable handleability and improved electroconductivity is
 manufactured with improved productivity. The cracking of the carbonized

resin material is suppressed.

DESCRIPTION OF DRAWINGS - The graph shows the relation between pore volume and pore diameter of the porous carbon base material. (Drawing includes non-English language text).

FS CPI; EPI

MC CPI: A08-M09A; A10-E05B; A12-E06; L03-E04A2; L03-E04B
EPI: X16-C01C; X16-E06A

L47 ANSWER 3 OF 8 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

AN 2004-473036 [45] WPIX

DNC C2004-177362 [45]

DNN N2004-373995 [45]

TI Porous carbon material used for casting nozzle and air slide, has preset dispersion at preset permeability

DC E36; L03; Q62; X16

IN YASUDA M

PA (IBIG-C) IBIDEN CO LTD

CYC 1

PI JP 2004182579 A 20040702 (200445)* JA 13[3]

ADT JP 2004182579 A JP 2003-6281 20030114

PRAI JP 2002-293689 20021007

IPCR B22D0011-07 [I,A]; B22D0011-07 [I,C]; C01B0031-00 [I,C]; C01B0031-02 [I,A]; C04B0035-52 [I,A]; C04B0035-52 [I,C]; F16C0032-06 [I,A]; F16C0032-06 [I,C]; F16C0033-04 [I,C]; F16C0033-12 [I,A]; H01M0008-02 [I,A]; H01M0008-02 [I,C]

AB JP 2004182579 A UPAB: 20050530

NOVELTY - A porous carbon material has permeability of 0.02-0.5 cm²/sec, measured using nitrogen gas having pressure of 0.5 MPa. The dispersion of carbon material is less than 10% at permeability of 0.02-0.5 cm²/sec.

USE - For oil continuous-casting nozzle, air slide, static-pressure gas bearing and separator for fuel cells.

ADVANTAGE - The carbon material has high porosity, large permeability and reduced dispersion. The carbon material enables uniform supply of oil and air, when used for casting nozzle and gas bearing, respectively. The carbon material stably enables the uniform maintenance of output voltage and water content in the contact area of gas diffusion electrode, when used for separator for fuel cells. The porous carbon material has excellent mechanical characteristics.

DESCRIPTION OF DRAWINGS - The graph shows the accumulated total air-hole volume curve of carbon material, measured by mercury intrusion technique. (Drawing includes non-English language text).

TECH INORGANIC CHEMISTRY - Preferred Properties: The carbon material has volume of fine air-hole having radius of 0.5 microns or less, of 0.1 cc/g or more, when measured by mercury intrusion technique. The volume of fine air-hole having radius of 0.8 microns or more is 10% or less of the volume of air-hole having radius of 0.01 microns or more.

ABEX EXAMPLE - Raw coke was ground to obtain a carbon raw material. The raw material was classified such that the mean particle diameter of raw material was 10 microns. The obtained raw material was filled in a rubber die, and pressurized at 1000 kgf/cm² to obtain cylinder-shaped compact. The obtained compact was bake-processed at 1000degreesC and at speed of 5 degrees C/hour. The baked material was subjected to machining to obtain cylinder-shaped carbon material having diameter of 200 mm and height of 200 mm. The air-hole radius of the obtained carbon material was measured by mercury intrusion technique. The air-hole

had large accumulated volume, and the carbon material had high porosity. The volume of fine air-hole having radius of 0.5 microns or less, was 0.1 cc/g or more. The volume of air-hole having radius of 0.8 microns or more occupied 2% of volume of air-hole having radius of 0.01 microns or more. The average air-hole radius of the carbon material was 0.38 microns. The dispersion in air-hole radius was +/- 7.9%.

FS CPI; GMPI; EPI
MC CPI: E31-N04D; L03-E04G
EPI: X16-C; X16-F02

L47 ANSWER 4 OF 8 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

AN 2004-331488 [31] WPIX

DNC C2004-125560 [31]

DNN N2004-264457 [31]

TI Foam useful for electrical and electrochemical applications, comprises at least 70 weight% of carbon with pores in the cell framework material of 0.2-50 nm in size and a volume of 0.01-0.8 cm³/g

DC A21; A25; A85; A88; E36; J01; J03; J04; J06; L02; L03; V01; X16

IN DESSEIX M; HEMPEL R; HESSE M; ROTERMUND U; RUDLOFF J

PA (BADI-C) BASF AG

CYC 104

PI DE 10243240 A1 20040325 (200431)* DE 17[0]

WO 2004026792 A1 20040401 (200431) DE

AU 2003266363 A1 20040408 (200462) EN

EP 1542941 A1 20050622 (200541) DE

US 20060014908 A1 20060119 (200607) EN

CN 1681748 A 20051012 (200612) ZH

JP 2006512265 W 20060413 (200629) JA 30

EP 1542941 B1 20061129 (200680) DE

DE 50305864 G 20070111 (200706) DE

ES 2277148 T3 20070701 (200746) ES

ADT DE 10243240 A1 DE 2002-10243240 20020917; AU 2003266363 A1 AU 2003-266363 20030908; CN 1681748 A CN 2003-822042 20030908; DE 50305864 G DE 2003-505864 20030908; EP 1542941 A1 EP 2003-797284 20030908; EP 1542941 B1 EP 2003-797284 20030908; DE 50305864 G EP 2003-797284 20030908; WO 2004026792 A1 WO 2003-EP9943 20030908; EP 1542941 A1 WO 2003-EP9943 20030908; US 20060014908 A1 WO 2003-EP9943 20030908; JP 2006512265 W WO 2003-EP9943 20030908; EP 1542941 B1 WO 2003-EP9943 20030908; DE 50305864 G WO 2003-EP9943 20030908; JP 2006512265 W JP 2004-537012 20030908; US 20060014908 A1 US 2005-526930 20050308; ES 2277148 T3 EP 2003-797284 20030908

FDT DE 50305864 G Based on EP 1542941 A; AU 2003266363 A1 Based on WO 2004026792 A; EP 1542941 A1 Based on WO 2004026792 A; JP 2006512265 W Based on WO 2004026792 A; EP 1542941 B1 Based on WO 2004026792 A; DE 50305864 G Based on WO 2004026792 A; ES 2277148 T3 Based on EP 1542941 A

PRAI DE 2002-10243240 20020917

IC ICM C04B038-00

IPCI B01D0039-00 [I,A]; B01D0039-20 [I,A]; C01B0031-00 [I,C]; C01B0031-02 [I,A]; C04B0035-52 [I,A]; C04B0038-00 [I,A]; C04B0038-00 [I,C]; C04B0038-00 [I,A]; C04B0038-00 [I,C]; C04B0038-06 [I,A]; C08G0018-00 [I,C]; C08G0018-02 [I,A]; C08G0018-06 [I,A]; H01G0009-00 [I,A]; H01G0009-058 [I,A]; H01M0004-96 [I,A]

IPCR C04B0038-00 [I,A]; C04B0038-00 [I,C]

AB DE 10243240 A1 UPAB: 20050906

NOVELTY - A foam (I) comprises at least 70 weight% of carbon with an average cell size of over 20 microns, a porosity of 35-99.5% , over 90% open cells, an internal surface area of over 50 m²/g with cell

crosspieces that have a triangular cross-section with inwardly curved sides and pores in the cell framework material of 0.2-50 nm in size and a volume of 0.01-0.8 cm³/g.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for:

(1) a powder material (II) prepared by comminution of the foam (I) and;

(2) a process for the production of the foam (I) by pyrolysis of a polymer foam, comprising at least 30 weight% of a polymer material having a nitrogen content of greater than 6 weight%, porosity of 35-99.5%, open cell content of less than 1% and inorganic materials processed into the foam or applied onto the surface whereby during and/or after pyrolysis the foam treated with water vapor, carbon dioxide and/or oxygen at over 400 degreesC.

USE - The foam (I) is useful for electrical and electrochemical applications, as a filter and thermal insulation, as a support or storage material and as a starting material for further reactions. The powder (II) is useful as an electrode material for super capacitors and/or fuel cells (claimed).

ADVANTAGE - The foam (I) has increased internal surface area.

TECH POLYMERS - Preferred Composition: The foam (I) has a hydrogen content of less than 3 wt.% and nitrogen content of greater than 0.01 wt.%. The framework material has a density of 0.8-2.3 g/cm³, an electrical conductivity of 10-10 to 5000 S/cm, a ¹³C solid nuclear magnetic resonance spectroscopy signal of 100-200 ppm comprising over 95% of the spectrum surface area and is crystalline or amorphous.

Preferred Process: The polymer foam is a urea-formaldehyde resin, melamine-formaldehyde resin or polymeric isocyanate adduct having a polyisocyanurate structure characterized by a relative ratio of the extinction of the isocyanurate infra-red band at 1410 cm⁻¹ to the extinction of the aromatic bands at 1600 cm⁻¹ of greater than 1.5. The polymeric isocyanate adduct is prepared by reaction of polyisocyanates with themselves, active hydrogen group containing compounds or other isocyanate-reactive compounds using catalysts, stabilizers, propellants and optionally other additives. The active hydrogen group containing compound is a polyesterol based on aromatic polycarboxylic acids and multifunctional alcohols. The isocyanate-reactive compound is an organic acid, anhydride or epoxide. The catalyst is a crown-ether compound. The polymer foam contains non-cured phenol resin components and 0.1-60 wt.% inorganic salts, metal powder or exfoliated graphite filler added by contact with corresponding solutions or dispersions. The inorganic salt is zinc chloride, calcium carbonate and/or ammonium polyphosphate. The pyrolysis is carried out by heating from room temperature to over 500degreesC and from over 500degreesC to 3000degreesC at 0.05-10 K/min in a nitrogen or noble gas atmosphere containing 0.5-80 vol.% water vapor or greater than 1 vol.% carbon dioxide. The pyrolysis is carried out at room temperature to 1500degreesC in the presence of 0.05-30 vol.% oxygen. The gas flow rate during pyrolysis or post treatment is 0.01 l/hour/g foam -10 l/minute/g foam.

ABEX EXAMPLE - A carbon foam (prepared by pyrolysis of an isocyanate based polymer in a nitrogen stream at 5 K/min to 800 degreesC, holding for one hour and cooling to 30 degreesC at 20 K/min) was heated to 800 degreesC at 5 K/min in a nitrogen stream. The foam was heated at 800 degreesC for 2 hours and treated with 2 l/min nitrogen and 1.2 l/min water vapor followed by cooling to 30 degreesC at 20 K/min. Weight loss after treatment was 18% and the product foam had a density of 74 kg/m³, porosity of 95%, carbon matrix density of 1.46 g/cm³, surface area (DIN 66131) of 793 m²/g and 4.5 nm radius pores in the cell framework (0.53 cm³/g pore volume). The initial foam had a density of 105 kg/m³, porosity of 93%, carbon matrix density of 1.60 g/cm³, surface area (DIN 66131) of 4.1 m²/g with no pores in the cell

framework.

FS CPI; EPI

MC CPI: A10-E05B; A11-A04; A12-S04A; A12-S09; E31-N04D; J01-H; J03-B01;
J04-E03; J06-B06; L02-A04; L02-H04; L03-A02B; L03-B03G; L03-E04B
EPI: V01-B01A1; V01-B01C; V01-B01D5; X16-E06A

L47 ANSWER 5 OF 8 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

AN 2002-743732 [81] WPIX

CR 2003-147433; 2007-360691

DNC C2002-210791 [81]

DNN N2002-585880 [81]

TI Electrode base material for **fuel cells** comprises
porous carbon film having fine continuous holes
of preset average pore size and porosity

DC A85; L03; X16

IN OYA N; YAO S

PA (UBEI-C) UBE IND LTD

CYC 1

PI JP 2002170574 A 20020614 (200281)* JA 8[5]

ADT JP 2002170574 A JP 2001-78497 20010319

PRAI JP 2000-287361 20000921

IPCR B01J0021-00 [I,C]; B01J0021-18 [I,A]; B01J0023-42 [I,A]; B01J0023-42
[I,C]; B01J0032-00 [I,A]; B01J0032-00 [I,C]; C01B0031-00 [I,C];
C01B0031-04 [I,A]; C04B0035-52 [I,A]; C04B0035-52
[I,C]; H01M0004-88 [I,A]; H01M0004-88 [I,C];
H01M0004-96 [I,A]; H01M0004-96 [I,C];
H01M0008-10 [I,A]; H01M0008-10 [I,C]

AB JP 2002170574 A UPAB: 20050903

NOVELTY - An electrode base material comprises a **porous carbon** film having fine continuous holes with average pore size of 0.05-10 microns and porosity of 15-85%.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(1) metal micro-dispersed carbon film structure which has metal supported as nano-order microparticle; and

(2) carbon structure supporting metal catalyst comprising the metal micro-dispersed carbon film structure.

USE - Used for **fuel cells** such as solid polymer electrolyte group **fuel cell** or phosphoric acid group **fuel cell**.

ADVANTAGE - The gas flow is performed uniformly using the carbon film structure. The carbon film structure has high electroconductivity and thermal conductivity.

TECH ORGANIC CHEMISTRY - Preferred Electrode Base Material: The surfaces of the **carbon** film except the **pores** are flat. The **carbon** film has graphitization rate of 50% or more. The carbon film is obtained by heat carbonizing a porous heat resistant film under anaerobic atmosphere. Especially, several heat resistant polymer films are heat carbonized to form laminate of carbon film.

POLYMERS - Preferred Polymer: The heat resistant polymer is polyimide having biphenyl tetracarboxylic acid or its anhydride as a monomer component.

FS CPI; EPI

MC CPI: A05-J01B; A12-E06A; L03-E04B
EPI: X16-C01; X16-E06

L47 ANSWER 6 OF 8 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

AN 1988-294345 [42] WPIX

DNC C1988-130402 [21]

DNN N1988-223440 [21]

TI Porous electrode substrate for fuel cell - comprises carbon fibres randomly dispersed in carbonised resin

DC A35; A85; E36; L03; X16

IN FUKUI H; MIWA K; SHIMIZU K

PA (TORA-C) TORAY IND INC

CYC 9

PI EP 286945 A 19881019 (198842)* EN 21[9]

JP 63254669 A 19881021 (198848) JA

US 4851304 A 19890725 (198937) EN 16

CA 1303123 C 19920609 (199229) EN

EP 286945 B1 19930623 (199325) EN 28[9]

JP 05044779 B 19930707 (199330) JA 7

DE 3881941 G 19930729 (199331) DE

ADT EP 286945 A EP 1988-105396 19880405; JP 63254669 A JP 1987-88129 19870410;

JP 05044779 B JP 1987-88129 19870410; DE 3881941 G DE 1988-3881941

19880405; EP 286945 B1 EP 1988-105396 19880405; DE 3881941 G EP

1988-105396 19880405; CA 1303123 C CA 1988-563352 19880406; US 4851304 A

US 1988-179286 19880408

FDT DE 3881941 G Based on EP 286945 A; JP 05044779 B Based on JP 63254669 A

PRAI JP 1987-88129 19870410

IC ICM H01M004-96

ICS C04B035-52

IPCR H01M004-96 [I,A]; H01M004-96 [I,C]

AB EP 286945 A UPAB: 20050429

Porous electrode substrate (11a, 12a) for a fuel cell comprises carbon fibres bonded by a carbonised resin. The fibres are 3-20 mm long and 4-9 microns diameter and are randomly dispersed in a 2-dimensional plane. The carbonised resin content is 35-60 weight%. The substrate has pores of mean pore size 20-60 microns, porosity 60-80% and compression ratio not more than 20%.

USE/ADVANTAGE - The electrode substrate (11a, 12a) is used with a catalyst layer (11b, 12b), especially in a phosphoric acid conductivity, fuel cell. It has high electrical planar resistivity below 0.02 ohm, chemical stability, gas permeability and flexural strength.

FS CPI; EPI

MC CPI: A10-E05B; A12-E06A; E31-N04D; L03-E04B

EPI: X16-E06

L47 ANSWER 7 OF 8 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

AN 1984-234821 [38] WPIX

DNC C1984-099172 [16]

DNN N1984-175676 [16]

TI Fuel cell electrode base - is made from pitch-type carbon fibre, phenol* resin binder and PVA

DC A85; L03; X16

IN FUJIMAKI H; FUKUDA H; HIRUTA M; KAJI H; OMI S; YAMANOBE Y

PA (KURE-C) KUREHA CHEM IND CO LTD

CYC 1

PI JP 59141170 A 19840813 (198438)* JA 5[0]

ADT JP 59141170 A JP 1983-14409 19830131

PRAI JP 1983-14409 19830131

IPCR C04B0035-83 [I,A]; C04B0035-83 [I,C];

H01M0004-96 [I,A]; H01M0004-96 [I,C]

AB JP 59141170 A UPAB: 20050421

The electrode base is composed of carbon fibre having continuous pores, 40-85% porosity, at least 80 kg/sq.cm bending strength, 100-1000 ml/sq.cm.hr.mm.Aq gas permeability, below 5 x 10 power minus 2 ohm.cm.volume specific resistance and 5-30 micron fine pores (at least 70%).

ADVANTAGE - Mechanical strength and electroconductivity are improved. - In an example, 30-40wt.% pitch type carbon fibre (12-16 microns dia., 0.1-0.6 mm long), 30-35wt.% binder (phenol resin particles not more than 100 microns dia.), 25-40wt.% organic particles (PVA, at least 70wt.% particles 30-300 microns) were uniformly mixed in a blade blender. The mixture was press-moulded at 75 kg/sq.cm, and 130 deg.C for 5 mins. into 3 mm thick sheet. The sheet was heated at 150 deg.C under 0.5 kg/sq.cm for 6 hrs. and the binder resin was hardened. The sheet was put between a graphite plate, which was baked at 2000 deg.C in inert gas for 1 hr. - Obtd. electrode base had porosity 60-70 vol %, bending strength 130-195 kg/sq.cm, gas permeability 130-980 ml/sq.cm.hr.mm.Aq and specific resistance $2.1 - 3.5 \times 10^2$ ohm.cm.

FS CPI; EPI

MC CPI: A12-E06; L03-E04

EPI: X16-E06

L47 ANSWER 8 OF 8 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

AN 1982-84152E [40] WPIX

TI Shaped carbon fibre articles of controlled porosity -
for filters and base plates for fuel cell electrodes

DC A81; E36; J01; L02; L03; P73; X16

IN FUJIMAKI H; FUKUDA H; KAJI H

PA (KURE-C) KUREHA KAGAKU KOGYO KK

CYC 6

PI GB 2095656 A 19821006 (198240)* EN 10

DE 3211474 A 19821014 (198242) DE

FR 2503137 A 19821008 (198246) FR

JP 57166354 A 19821013 (198247) JA

US 4434206 A 19840228 (198411) EN

CA 1179808 A 19841227 (198505) EN

GB 2095656 B 19850403 (198514) EN

DE 3211474 C 19860424 (198618) DE

JP 61050912 B 19861106 (198649) JA

ADT GB 2095656 A GB 1982-8624 19820324; JP 57166354 A JP 1981-48700 19810401;

JP 61050912 B JP 1981-48700 19810401; US 4434206 A US 1982-358373

19820315; DE 3211474 A DE 1982-3211474 19820329

PRAI JP 1981-48700 19810401

IPCR B01D0039-20 [I,A]; B01D0039-20 [I,C]; C04B0035-83 [I,A];

C04B0035-83 [I,C]; C04B0038-00 [I,A]; C04B0038-00 [I,C];

C04B0038-04 [I,A]; C04B0038-04 [I,C]; C25B0011-00 [I,C]; C25B0011-03

[I,A]; D01F0011-00 [I,C]; D01F0011-12 [I,A]; H01M0004-70 [I,C];

H01M0004-80 [I,A]; H01M0004-96 [I,A];

H01M0004-96 [I,C]

AB GB 2095656 A UPAB: 20050420

A shaped article of porous carbon comprising

carbon fibres has a compression strength higher than 50 Kg/sq.cm.,

a porosity of 50-80% and with not less than 60% of the pores having a size distribution range of 20 microns between the maximum and minimum pore dia.

The article is made by adding 20-100 pts.weight of a soluble granular substance (PVA, PVC, polystyrene, starch) with not less than 70% of the

granules having a size variation of 30 microns, to 100 pts.weight of a mixture of 100 pts. short carbonaceous fibres and 20-100 pts. resin. After hot

shaping, the granules are removed by dissolving in a solvent and the shaped mass is baked.

Used as filters, and as base plates for electrodes in fuel

cells. Controlled porosity and pore size distribution is provided.

FS CPI; GMPI; EPI

MC CPI: A10-E05B; A12-E06; A12-H04; A12-W12D; E31-N02; J01-F03; J01-G02;

L02-H04; L03-E04B

EPI: X16-E06

=> FILE HCAPL

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FILE COVERS 1907 - 24 Oct 2007 VOL 147 ISS 18

FILE LAST UPDATED: 23 Oct 2007 (20071023/ED)

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This file contains CAS Registry Numbers for easy and accurate substance identification.

=> D QUE L34

L25 17513 SEA FILE=HCAPLUS ABB=ON (PORE# OR POROUS OR POROSITY OR ORIFICE OR APERTURE# OR HOLE OR HOLES) (6A) CARBON
L26 25758 SEA FILE=HCAPLUS ABB=ON (PORE# OR POROUS OR POROSITY OR ORIFICE OR APERTURE# OR HOLE OR HOLES) (3A) (VOLUME? OR MICRON# OR "CC/G" OR "ML/G")
L27 1595 SEA FILE=HCAPLUS ABB=ON L25 AND L26
L28 37 SEA FILE=HCAPLUS ABB=ON L27 AND FUEL (2A) CELL#
L29 115 SEA FILE=HCAPLUS ABB=ON L27 AND ELECTROCHEMICAL/SC, SX
L30 30 SEA FILE=HCAPLUS ABB=ON L29 AND (SHEET# OR COMPOSITE# OR SUBSTRATE# OR FIBER# (3A) (RESIN? OR PLASTIC? OR POLYMER?))
L31 9 SEA FILE=HCAPLUS ABB=ON L27 AND (MEA OR MEMBRANE? (3A) ELECTRODE #)
L32 8 SEA FILE=HCAPLUS ABB=ON L29 AND L31
L33 56 SEA FILE=HCAPLUS ABB=ON L28 OR L30 OR L32
L34 37 SEA FILE=HCAPLUS ABB=ON L33 AND (1840-2003)/PRY, AY, PY

=> FILE COMPENDEX

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FILE LAST UPDATED: 22 OCT 2007 <20071022/UP>

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=> D QUE L40

L25 17513 SEA FILE=HCAPLUS ABB=ON (PORE# OR POROUS OR POROSITY OR

ORIFICE OR APERTURE# OR HOLE OR HOLES) (6A) CARBON
L26 25758 SEA FILE=HCAPLUS ABB=ON (PORE# OR POROUS OR POROSITY OR
ORIFICE OR APERTURE# OR HOLE OR HOLES) (3A) (VOLUME? OR MICRON#
OR "CC/G" OR "ML/G")
L35 386 SEA FILE=COMPENDEX ABB=ON L25 AND L26
L36 16 SEA FILE=COMPENDEX ABB=ON L35 AND FUEL(2A) CELL#
L38 2 SEA FILE=COMPENDEX ABB=ON L35 AND (MEA OR MEMBRANE# (2A) ELECTRO
DE#)
L39 16 SEA FILE=COMPENDEX ABB=ON L36 OR L38
L40 4 SEA FILE=COMPENDEX ABB=ON L39 NOT (2004-2007)/PY

=> FILE INSPEC

FILE 'INSPEC' ENTERED AT 12:11:10 ON 24 OCT 2007

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FILE LAST UPDATED: 24 OCT 2007 <20071024/UP>
FILE COVERS 1898 TO DATE.

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L26 25758 SEA FILE=HCAPLUS ABB=ON (PORE# OR POROUS OR POROSITY OR
ORIFICE OR APERTURE# OR HOLE OR HOLES) (3A) (VOLUME? OR MICRON#
OR "CC/G" OR "ML/G")
L35 386 SEA FILE=COMPENDEX ABB=ON L25 AND L26
L36 16 SEA FILE=COMPENDEX ABB=ON L35 AND FUEL(2A) CELL#
L38 2 SEA FILE=COMPENDEX ABB=ON L35 AND (MEA OR MEMBRANE# (2A) ELECTRO
DE#)
L39 16 SEA FILE=COMPENDEX ABB=ON L36 OR L38
L41 5 SEA FILE=INSPEC ABB=ON L39 NOT (2004-2007)/PY

=> DUP REM L34 L40 L41

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PROCESSING COMPLETED FOR L34

PROCESSING COMPLETED FOR L40

PROCESSING COMPLETED FOR L41

L49 38 DUP REM L34 L40 L41 (8 DUPLICATES REMOVED)

=> D L49 ALL 1-38

L49 ANSWER 1 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN
AN 2005:493824 HCAPLUS

DN 143:29510
 ED Entered STN: 10 Jun 2005
 TI Power generating element for liquid fuel cell and its manufacture
 IN Kashino, Hiroshi; Arishima, Yasuo; Nakai, Toshihiro; Nakamura, Shingo; Shibata, Shinsuke; Saibara, Shoji
 PA Hitachi Maxell, Ltd., Japan
 SO PCT Int. Appl., 32 pp.
 CODEN: PIXXD2
 DT Patent
 LA Japanese
 IC ICM H01M008-02
 ICS H01M004-86; H01M004-90; H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2005053073	A1	20050609	WO 2004-JP17364	20041122 <--
	W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW			
	RW:	BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
	JP 2005183368	A	20050707	JP 2004-337811	20041122 <--
	JP 3981684	B2	20070926		
	DE 112004000278	T5	20051229	DE 2004-112004000278	20041122 <--
	CN 1745492	A	20060308	CN 2004-80003203	20041122 <--
	US 2006024562	A1	20060202	US 2005-537169	20050601 <--
PRAI	JP 2003-396187	A	20031126	<--	
	WO 2004-JP17364	W	20041122		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2005053073	ICM	H01M008-02
	ICS	H01M004-86; H01M004-90; H01M008-10
	IPCI	H01M0008-02 [ICM,7]; H01M0004-86 [ICS,7]; H01M0004-90 [ICS,7]; H01M0008-10 [ICS,7]
	IPCR	H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
	ECLA	H01M004/86B; H01M008/10C
JP 2005183368	IPCI	H01M0004-86 [I,A]; H01M0004-88 [I,A]; H01M0004-92 [I,A]; H01M0004-90 [I,C*]; H01M0008-02 [I,A]; H01M0008-10 [N,A]
	IPCR	H01M0004-86 [I,A]; H01M0004-86 [I,C*]; H01M0004-88 [I,A]; H01M0004-88 [I,C*]; H01M0004-90 [I,C*]; H01M0004-92 [I,A]; H01M0008-02 [I,A]; H01M0008-02 [I,C*]; H01M0008-10 [N,A]; H01M0008-10 [N,C*]
	FTERM	5H018/AA07; 5H018/BB03; 5H018/BB06; 5H018/BB08; 5H018/BB11; 5H018/BB12; 5H018/EE03; 5H018/EE05; 5H018/EE10; 5H018/EE17; 5H018/EE18; 5H018/HH03; 5H018/HH04; 5H026/AA08; 5H026/BB06; 5H026/EE02; 5H026/EE05; 5H026/EE08; 5H026/HH03; 5H026/HH04
DE 112004000278	IPCI	H01M0008-02 [ICS,7]; H01M0004-86 [ICS,7]; H01M0004-90

[ICS,7]; H01M0008-10 [ICS,7]
 IPCR H01M0004-86 [I,C*]; H01M0008-10 [I,C*]; H01M0004-86 [I,A]; H01M0008-10 [I,A]
 CN 1745492 IPCI H01M0008-02 [I,A]; H01M0004-86 [I,A]; H01M0004-90 [I,A]; H01M0008-10 [I,A]
 IPCR H01M0008-02 [I,A]; H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0008-02 [I,C]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
 ECLA H01M004/86B; H01M008/10C
 US 2006024562 IPCI H01M0004-86 [I,A]; H01M0004-92 [I,A]; H01M0004-90 [I,C*]; H01M0004-96 [I,A]; H01M0004-88 [I,A]
 IPCR H01M0004-86 [I,A]; H01M0004-86 [I,C]; H01M0004-88 [I,C]; H01M0004-88 [I,A]; H01M0004-90 [I,C]; H01M0004-92 [I,A]; H01M0004-96 [I,C]; H01M0004-96 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
 NCL 429/040.000; 429/044.000; 502/101.000
 ECLA H01M004/86B; H01M008/10C
 AB The power generating element has an O cathode, a fuel oxidizing anode, and a solid electrolyte between the electrodes, where each electrode has a ≥ 20 μm thick catalyst layer, ≥ 1 of the catalyst layers contains fine pore having diam 0.3-2.0 μm , with the **volume** of fine **pore** taking up $\geq 4\%$ of the total **pore volume** The element is prepared by: dispersing a catalyst and a material containing a H⁺ conducting substance in a solvent, removing the solvent to form **composite** particles, an grinding the particles to prepare the catalyst layer.
 ST solid electrolyte **fuel cell** electrode catalyst layer structure manuf
 IT Polyoxyalkylenes, uses
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (fluorine- and sulfo-containing, ionomers; structure and manufacture of porous catalyst layers for solid oxide **fuel cell** electrodes)
 IT Fluoropolymers, uses
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (polyoxyalkylene-, sulfo-containing, ionomers; structure and manufacture of porous catalyst layers for solid oxide **fuel cell** electrodes)
 IT Ionomers
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (polyoxyalkylenes, fluorine- and sulfo-containing; structure and manufacture of porous catalyst layers for solid oxide **fuel cell** electrodes)
 IT **Fuel cell** electrodes
 (structure and manufacture of porous catalyst layers for solid oxide **fuel cell** electrodes)
 IT **Carbon black**, uses
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (structure and manufacture of **porous** catalyst layers for solid oxide **fuel cell** electrodes)
 IT 7440-06-4, Platinum, uses 12779-05-4
 RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (structure and manufacture of porous catalyst layers for solid oxide

fuel cell electrodes)

IT 7631-86-9, Silica, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (structure and manufacture of porous catalyst layers for solid oxide fuel cell electrodes)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD
 RE

- (1) Asahi Glass Co Ltd; JP 200215743 A 2002
- (2) Matsushita Electric Industrial Co Ltd; JP 04-305249 A 1992 HCAPLUS
- (3) Matsushita Electric Industrial Co Ltd; JP 09-92293 A 1997 HCAPLUS
- (4) Matsushita Electric Industrial Co Ltd; WO 01099216 A1 2001
- (5) Matsushita Electric Industrial Co Ltd; EP 1294034 A1 2001 HCAPLUS
- (6) Matsushita Electric Industrial Co Ltd; US 20030143454 A1 2001
- (7) Nec Corp; JP 2003317742 A 2003 HCAPLUS
- (8) Sanyo Electric Co Ltd; JP 2001338651 A 2001 HCAPLUS
- (9) Toray Industries Inc; JP 2004296435 A 2004 HCAPLUS

L49 ANSWER 2 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2004:485903 HCAPLUS

DN 141:40691

ED Entered STN: 17 Jun 2004

TI Membrane-electrode structure for polymer electrolyte
 fuel cell

IN Fukuda, Kaoru; Tanaka, Ichiro; Tani, Masaki; Matsuo, Junji

PA Honda Motor Co., Ltd., Japan

SO Eur. Pat. Appl., 26 pp.

CODEN: EPXXDW

DT Patent

LA English

IC ICM H01M004-86

ICS H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy
 Technology)

Section cross-reference(s): 38

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1429403	A2	20040616	EP 2003-26936	20031125 <--
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
JP 2004193106	A	20040708	JP 2003-360615	20031021 <--
US 2004115502	A1	20040617	US 2003-720280	20031125 <--
PRAI JP 2002-341362	A	20021125 <--		
JP 2003-360615	A	20031021 <--		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 1429403	ICM	H01M004-86
	ICS	H01M008-10
	IPCI	H01M0004-86 [ICM,7]; H01M0008-10 [ICS,7]
	IPCR	H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0004-90 [N,C*]; H01M0004-92 [N,A]; H01M0004-96 [I,C*]; H01M0004-96 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-04 [I,C*]; H01M0008-04 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
	ECLA	H01M004/86B; H01M004/88
JP 2004193106	IPCI	H01M0004-86 [ICM,7]; H01M0008-02 [ICS,7]; H01M0008-10 [ICS,7]; H01M0008-04 [ICS,7]

IPCR H01M0004-86 [I,A]; H01M0004-86 [I,C*]; H01M0004-96 [I,A]; H01M0004-96 [I,C*]; H01M0008-02 [I,A]; H01M0008-02 [I,C*]; H01M0008-04 [N,A]; H01M0008-04 [N,C*]; H01M0008-10 [I,A]; H01M0008-10 [I,C*]

FTERM 5H018/AA06; 5H018/AS02; 5H018/AS03; 5H018/BB03; 5H018/BB06; 5H018/BB08; 5H018/BB12; 5H018/CC06; 5H018/DD05; 5H018/DD06; 5H018/DD08; 5H018/EE03; 5H018/EE05; 5H018/EE08; 5H018/EE16; 5H018/EE17; 5H018/EE18; 5H018/EE19; 5H018/HH00; 5H018/HH04; 5H018/HH05; 5H026/AA06; 5H026/CX05; 5H026/EE05; 5H026/EE18; 5H026/HH00; 5H026/HH04; 5H026/HH05; 5H027/AA06

US 2004115502 IPCI H01M0008-10 [ICM,7]; H01M0004-96 [ICS,7]
 IPCR H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0004-90 [N,C*]; H01M0004-92 [N,A]; H01M0004-96 [I,C*]; H01M0004-96 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-04 [I,C*]; H01M0008-04 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]

NCL 429/033.000; 429/044.000

ECLA H01M004/86B; H01M004/88

AB A **membrane-electrode** structure capable of exhibiting excellent elec. power generation performance even in a high current region and a polymer electrolyte **fuel cell** using the **membrane-electrode** structure are provided. Addnl., elec. appliances and transport machines each using the above-described polymer electrolyte **fuel cell** are provided. The **membrane-electrode** structure comprises an anode, a cathode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes. The cathode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the **carbon** particles, a **pore** forming member and an ion conducting polymer falling within the weight ratio range from 1.0 to 1.8 in relation to the carbon particles, and is in contact with the polymer electrolyte **membrane** through the **electrode** catalyst layer. The electrode catalyst layer has a total sum **volume** of the **pores** falling within the pore diameter range from 0.01 to 30 μm , of the pores formed by the pore forming member, equal to or more than 6.0 $\mu\text{L}/\text{cm}^2\text{-mg}$ catalyst. The pores formed by the pore forming member have a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm .

ST polymer electrolyte **fuel cell** **membrane**
electrode structure

IT Catalysts
 (electrocatalysts; **membrane-electrode** structure for polymer electrolyte **fuel cell**)

IT Polyoxyalkylenes, uses
 RL: DEV (Device component use); USES (Uses)
 (fluorine- and sulfo-containing, ionomers; **membrane-electrode** structure for polymer electrolyte **fuel cell**)

IT Electric apparatus
Fuel cell electrodes
Fuel cell electrolytes
 (**membrane-electrode** structure for polymer electrolyte **fuel cell**)

IT Carbon black, uses
 RL: CAT (Catalyst use); TEM (Technical or engineered material use); USES (Uses)

(membrane-electrode structure for polymer electrolyte fuel cell)

IT Polyketones
 RL: DEV (Device component use); USES (Uses)
 (polyarylene-polyether-, sulfonated; membrane-electrode structure for polymer electrolyte fuel cell)

IT Polysulfones, uses
 RL: DEV (Device component use); USES (Uses)
 (polyarylene-polyether-; membrane-electrode structure for polymer electrolyte fuel cell)

IT Polyethers, uses
 RL: DEV (Device component use); USES (Uses)
 (polyarylene-polyketone-, sulfonated; membrane-electrode structure for polymer electrolyte fuel cell)

IT Polyethers, uses
 RL: DEV (Device component use); USES (Uses)
 (polyarylene-polysulfone-; membrane-electrode structure for polymer electrolyte fuel cell)

IT Fuel cells
 (polymer electrolyte; membrane-electrode structure for polymer electrolyte fuel cell)

IT Fluoropolymers, uses
 RL: DEV (Device component use); USES (Uses)
 (polyoxyalkylene-, sulfo-containing, ionomers; membrane-electrode structure for polymer electrolyte fuel cell)

IT Ionomers
 RL: DEV (Device component use); USES (Uses)
 (polyoxyalkylenes, fluorine- and sulfo-containing; membrane-electrode structure for polymer electrolyte fuel cell)

IT Machinery
 (transport; membrane-electrode structure for polymer electrolyte fuel cell)

IT 12613-88-6
 RL: CAT (Catalyst use); USES (Uses)
 (membrane-electrode structure for polymer electrolyte fuel cell)

IT 7440-44-0, Carbon, uses
 RL: CAT (Catalyst use); TEM (Technical or engineered material use); USES (Uses)
 (membrane-electrode structure for polymer electrolyte fuel cell)

IT 582300-03-6, Nafion SE20192
 RL: DEV (Device component use); USES (Uses)
 (membrane-electrode structure for polymer electrolyte fuel cell)

IT 122325-09-1DP, reaction products with phenoxy derivatized benzophenone, sulfonated 463954-50-9DP, reaction products bisphenol AF benzophenone oligomer, sulfonated
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
 (membrane-electrode structure for polymer electrolyte fuel cell)

IT 122325-09-1P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
 (membrane-electrode structure for polymer

electrolyte fuel cell)

L49 ANSWER 3 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 2003:834316 HCAPLUS
 DN 139:326057
 ED Entered STN: 24 Oct 2003
 TI Manufacture of anodes for nonaqueous secondary lithium batteries with high discharge capacity and charge-discharge efficiency
 IN Yamada, Masayuki; Aoyama, Shigeo; Hsa, Yong-Yan; Ueda, Atsushi
 PA Hitachi Maxell Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 12 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M004-38
 ICS H01M004-02; H01M010-40
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003303588	A	20031024	JP 2003-30081	20030206 <--
	JP 3897709	B2	20070328		
	JP 2005135925	A	20050526	JP 2004-374141	20041224 <--
	JP 3987853	B2	20071010		
PRAI	JP 2002-31102	A	20020207	<--	
	JP 2003-30081	A3	20030206	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2003303588	ICM	H01M004-38
	ICS	H01M004-02; H01M010-40
	IPCI	H01M0004-38 [I,A]; H01M0004-02 [I,A]; H01M0010-40 [I,A]; H01M0010-36 [I,C*]
	IPCR	H01M0010-36 [I,C*]; H01M0010-40 [I,A]; H01M0004-02 [I,C*]; H01M0004-02 [I,A]; H01M0004-38 [I,C*]; H01M0004-38 [I,A]
JP 2005135925	IPCI	H01M0004-38 [I,A]; H01M0004-36 [I,A]; C22C0024-00 [I,A]; C22C0028-00 [I,A]; H01M0004-48 [I,A]; H01M0004-62 [I,A]; H01M0010-36 [I,A]
	IPCR	C22C0024-00 [I,A]; C22C0024-00 [I,C*]; C22C0028-00 [I,A]; C22C0028-00 [I,C*]; H01M0004-02 [I,A]; H01M0004-02 [I,C*]; H01M0004-04 [I,A]; H01M0004-04 [I,C*]; H01M0004-38 [I,A]; H01M0004-38 [I,C*]; H01M0004-62 [I,A]; H01M0004-62 [I,C*]; H01M0010-36 [I,C*]; H01M0010-40 [I,A]
	FTERM	5H029/AJ03; 5H029/AJ05; 5H029/AK03; 5H029/AL01; 5H029/AL02; 5H029/AL11; 5H029/AL12; 5H029/AM03; 5H029/AM04; 5H029/AM05; 5H029/CJ02; 5H029/CJ08; 5H029/CJ12; 5H029/CJ15; 5H029/CJ16; 5H029/DJ08; 5H029/DJ13; 5H029/DJ15; 5H029/DJ16; 5H029/EJ01; 5H029/EJ04; 5H029/HJ01; 5H029/HJ02; 5H029/HJ07; 5H029/HJ08; 5H029/HJ09; 5H029/HJ17; 5H050/AA07; 5H050/AA08; 5H050/BA17; 5H050/CA07; 5H050/CA08; 5H050/CA09; 5H050/CB01; 5H050/CB02; 5H050/CB11; 5H050/CB12; 5H050/DA03; 5H050/DA10; 5H050/DA11; 5H050/EA02; 5H050/EA04; 5H050/EA08; 5H050/FA13; 5H050/FA16; 5H050/FA17; 5H050/FA18; 5H050/GA02; 5H050/GA06; 5H050/GA10; 5H050/GA12; 5H050/GA16; 5H050/GA18; 5H050/HA01; 5H050/HA02; 5H050/HA08;

5H050/HA09; 5H050/HA17

- AB The anodes comprise porous **composite** particles containing 30-80 weight% materials containing elements capable of alloying with Li and electroconductive materials and showing **porosity** (V_s) = 35-70 **volume%** [$V_s = (1 - 1.35 + D_1/D_2) + 100$; D_1 = bulk d. of the **composite** particles (g/cm³); D_2 = true d. of the **composite** particles (g/cm³)]. The anodes are manufactured by mixing and granulating materials containing elements capable of alloying with Li, electroconductive materials, and polymers and heating the resulting **composite** particles for removal of the polymers by combustion or sublimation and forming pores in the particles. The materials may be manufactured by dispersing the materials containing elements capable of alloying with Li and the electroconductive materials in solvents and granulating the resulting mixts. by spray-drying. The materials may be manufactured by mixing the resulting **composite** particles with other electroconductive materials and granulating or covering the particles with C-containing materials. The anodes show suppressed expansion during charging.
- ST battery anode silicon carbon fiber graphite **composite**; lithium battery silicon carbon granulation
- IT Carbon black, uses
Carbon fibers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(**composite** components; manufacture of anodes containing porous **composite** particles for nonaq. secondary lithium batteries)
- IT Coal tar pitch
(fired for **carbon** coating; manufacture of anodes containing porous **composite** particles for nonaq. secondary lithium batteries)
- IT Polymers, uses
RL: CPS (Chemical process); NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(for forming pores in **composite** particles; manufacture of anodes containing porous **composite** particles for nonaq. secondary lithium batteries)
- IT Hydrocarbons, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(gases, CVD source for forming **carbon**; manufacture of anodes containing porous **composite** particles for nonaq. secondary lithium batteries)
- IT Atomizing (spraying)
(granulation; manufacture of anodes containing porous **composite** particles for nonaq. secondary lithium batteries)
- IT Secondary batteries
(lithium; manufacture of anodes containing porous **composite** particles for nonaq. secondary lithium batteries)
- IT Granulation
(manufacture of anodes containing porous **composite** particles for nonaq. secondary lithium batteries)
- IT Incineration
Sublimation
(of polymers for forming pores; manufacture of anodes containing porous **composite** particles for nonaq. secondary lithium batteries)
- IT Battery anodes
(secondary; manufacture of anodes containing porous **composite** particles for nonaq. secondary lithium batteries)
- IT 71-43-2, Benzene, processes 108-88-3, Toluene, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical

process); PROC (Process)

(CVD source for forming carbon; manufacture of anodes containing porous composite particles for nonaq. secondary lithium batteries)

IT 7440-21-3, Silicon, uses 7782-42-5, Graphite, uses 12201-89-7, Nickel silicide (NiSi₂)

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)

(composite component; manufacture of anodes containing porous composite particles for nonaq. secondary lithium batteries)

IT 9003-53-6, Polystyrene

RL: CPS (Chemical process); NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(for forming pores in composite particles; manufacture of anodes containing porous composite particles for nonaq. secondary lithium batteries)

IT 7440-44-0P, Carbon, uses

RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)

(manufacture of anodes containing porous composite particles for nonaq. secondary lithium batteries)

L49 ANSWER 4 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2003:356133 HCAPLUS

DN 138:324158

ED Entered STN: 09 May 2003

TI Electrocatalyst carrier formed from carbon black for electrochemical device

IN Igarashi, Hiroshi; Ueda, Masamichi; Suzuki, Mitsuo; Yoshimura, Shushichi; Kanamaru, Shinichi

PA N. E. Chemcat Corp., Japan; Mitsubishi Chemical Corporation

SO Eur. Pat. Appl., 20 pp.

CODEN: EPXXDW

DT Patent

LA English

IC ICM H01M004-92

ICS C09C001-48; C09C001-50; C25B011-04; G01N027-30

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1309024	A2	20030507	EP 2002-24109	20021029 <--
EP 1309024	A3	20050622		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK				
JP 2003201417	A	20030718	JP 2002-311850	20021025 <--
CA 2410139	A1	20030430	CA 2002-2410139	20021029 <--
US 2003108481	A1	20030612	US 2002-281968	20021029 <--
PRAI JP 2001-332798	A	20011030	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 1309024	ICM	H01M004-92
	ICS	C09C001-48; C09C001-50; C25B011-04; G01N027-30
	IPCI	H01M0004-92 [ICM,7]; H01M0004-90 [ICM,7,C*]; C09C0001-48 [ICS,7]; C09C0001-50 [ICS,7]; C09C0001-44 [ICS,7,C*]; C25B0011-04 [ICS,7]; C25B0011-00 [ICS,7,C*]; G01N0027-30 [ICS,7]
	IPCR	C09C0001-44 [I,C*]; C09C0001-50 [I,A]; C09C0001-56

[I,A]; C25B0009-06 [I,C*]; C25B0009-10 [I,A];
C25B0011-00 [I,C*]; C25B0011-12 [I,A]; H01M0004-86
[I,A]; H01M0004-86 [I,C*]; H01M0004-88 [I,A];
H01M0004-88 [I,C*]; H01M0004-90 [I,C*]; H01M0004-92
[I,A]; H01M0004-96 [I,A]; H01M0004-96 [I,C*];
H01M0008-10 [I,A]; H01M0008-10 [I,C*]
ECLA C09C001/50; C09C001/56; C25B009/10; C25B011/12;
H01M004/86B; H01M004/88; H01M004/92B; H01M004/96;
H01M008/10B2
JP 2003201417 IPCI C09C0001-50 [ICM,7]; C09C0001-44 [ICM,7,C*];
H01M0004-90 [ICS,7]; H01M0004-92 [ICS,7]; H01M0004-96
[ICS,7]; H01M0008-10 [ICS,7]
IPCR C09C0001-44 [I,C*]; C09C0001-50 [I,A]; H01M0004-90
[I,C*]; H01M0004-90 [I,A]; H01M0004-92 [I,A];
H01M0004-96 [I,C*]; H01M0004-96 [I,A]; H01M0008-10
[I,C*]; H01M0008-10 [I,A]
CA 2410139 IPCI B01J0032-00 [ICM,7]; B01J0020-20 [ICS,7]; B01J0023-42
[ICS,7]
IPCR C09C0001-44 [I,C*]; C09C0001-50 [I,A]; C09C0001-56
[I,A]; C25B0009-06 [I,C*]; C25B0009-10 [I,A];
C25B0011-00 [I,C*]; C25B0011-12 [I,A]; H01M0004-86
[I,A]; H01M0004-86 [I,C*]; H01M0004-88 [I,A];
H01M0004-88 [I,C*]; H01M0004-90 [I,C*]; H01M0004-92
[I,A]; H01M0004-96 [I,A]; H01M0004-96 [I,C*];
H01M0008-10 [I,A]; H01M0008-10 [I,C*]
US 2003108481 IPCI C23C0028-00 [ICM,7]; C25D0001-00 [ICS,7]; C25C0007-00
[ICS,7]; C25B0009-00 [ICS,7]; H01M0004-96 [ICS,7];
H01M0008-10 [ICS,7]; C09C0001-48 [ICS,7]; C09C0001-44
[ICS,7,C*]
IPCR C09C0001-44 [I,C*]; C09C0001-50 [I,A]; C09C0001-56
[I,A]; C25B0009-06 [I,C*]; C25B0009-10 [I,A];
C25B0011-00 [I,C*]; C25B0011-12 [I,A]; H01M0004-86
[I,A]; H01M0004-86 [I,C*]; H01M0004-88 [I,A];
H01M0004-88 [I,C*]; H01M0004-90 [I,C*]; H01M0004-92
[I,A]; H01M0004-96 [I,A]; H01M0004-96 [I,C*];
H01M0008-10 [I,A]; H01M0008-10 [I,C*]
NCL 423/449.100; 204/194.000; 204/279.000; 429/030.000;
429/044.000; 502/185.000
ECLA C09C001/50; C09C001/56; C25B009/10; C25B011/12;
H01M004/86B; H01M004/88; H01M004/92B; H01M004/96;
H01M008/10B2
AB A carbon black is provided which is useful as an electrocatalyst carrier.
The carbon black has a DBP oil absorption of 170 to 300 cm³/100 g, a sp.
surface area as measured by a BET method of 250 to 400 m²/g, a primary
particle diameter value of 10 to 17 nm, and a total volume of open
pores at the surface which have a pore radius of 10 to 30 nm of
0.40 to 2.0 cm³/g. The electrocatalyst can be used in electrochem.
devices such as solid polymer electrolyte fuel cells.
ST fuel cell electrocatalyst carrier carbon black;
electrochem cell electrocatalyst carrier carbon black
IT Electrolytic cells
Pore size distribution
Sensors
Surface area
(electrocatalyst carrier formed from carbon black for
electrochem. device)
IT Carbon black, uses
RL: CAT (Catalyst use); SPN (Synthetic preparation); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(electrocatalyst carrier formed from carbon black for electrochem.

device)
 IT Catalysts
 (electrocatalysts; electrocatalyst carrier formed from carbon black for electrochem. device)
 IT Fuel cells
 (solid electrolyte, polymer electrolyte; electrocatalyst carrier formed from carbon black for electrochem. device)
 IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses 7440-33-7, Tungsten, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses 7440-66-6, Zinc, uses
 RL: CAT (Catalyst use); USES (Uses)
 (electrocatalyst carrier formed from carbon black for electrochem. device)
 IT 16941-12-1, Hexachloroplatinic acid
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
 (electrocatalyst carrier formed from carbon black for electrochem. device)

L49 ANSWER 5 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2003:138363 HCAPLUS

DN 138:371593

ED Entered STN: 24 Feb 2003

TI Measurement of O₂-N₂ effective diffusivity in porous media at high temperatures by using an electrochemical cell

AU Zhao, Feng; Armstrong, Tad J.; Virkar, Anil V.

CS Department of Materials Science and Engineering, University of Utah, Salt Lake City, UT, 84112, USA

SO Journal of the Electrochemical Society (2003), 150(3), A249-A256

CODEN: JESOAN; ISSN: 0013-4651

PB Electrochemical Society

DT Journal

LA English

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

AB The effective diffusivity of O₂-N₂ in porous media was measured at high temps. (650-800°C) by using an electrochem. concentration cell. Porous membranes having total porosity between 29 and 48 vol% were fabricated from Sr-doped LaMnO₃ with 20 to 30 wt% carbon added as a pore former. The O₂-N₂ effective binary diffusivity, D_{O2-N2eff}, at 800°C increased from .apprx.0.016 to .apprx.0.12 cm²/s with increasing open porosity between 15 and 44 vol%. The D_{O2-N2eff} exhibited a nonlinear dependence on open porosity and increased dramatically for samples with greater than 35 vol% open porosity. The estimated effective Knudsen diffusivities of O₂ and N₂, D_{O2Keff} and D_{N2Keff}, at 800°C were an order of magnitude higher than the effective binary diffusivity, D_{O2-N2eff}. Thus, O₂-N₂ transport through the porous membranes was governed by the effective binary diffusivity, D_{O2-N2eff}. The effects of O₂-N₂ effective binary diffusivity, D_{O2-N2eff}, on concentration polarization of cathodes for solid oxide fuel cells were assessed. The nonlinear behavior of the O₂-N₂ effective diffusivity as a function of open porosity indicates that a critical amount of porosity in the cathode is necessary to ensure that the overpotential due to concentration polarization is small. The temperature dependence of D_{O2-N2eff} was investigated between 650 and 800°C, which was in accord with the Chapman-Enskog model.

ST fuel cell cathode oxygen nitrogen diffusivity porosity
 IT Electrolytic polarization
 (concentration; measurement of O2-N2 effective diffusivity in porous media
 at high temps. by using an electrochem. cell)

IT Diffusion
 Fuel cell cathodes
 Porosity
 Simulation and Modeling
 (measurement of O2-N2 effective diffusivity in porous media at high
 temps. by using an electrochem. cell)

IT 7727-37-9, Nitrogen, processes 7782-44-7, Oxygen, processes
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical
 process); PROC (Process)
 (measurement of O2-N2 effective diffusivity in porous media at high
 temps. by using an electrochem. cell)

RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD
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L49 ANSWER 6 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2003:225872 HCAPLUS

DN 138:388084

ED Entered STN: 24 Mar 2003

TI Pt/C electrocatalyst for proton exchange membrane fuel
 cell

AU Xu, Hongfeng; Lin, Zhiyin; Qiu, Yanling; Tang, Qian

CS Department of Environmental Science and Engineering, Dalian Railway
 Institute, Dalian, 116028, Peop. Rep. China

SO Cuihua Xuebao (2003), 24(2), 143-148

CODEN: THHPD3; ISSN: 0253-9837

PB Kexue Chubanshe

DT Journal

LA Chinese

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

AB Proton exchange membrane fuel cell has attracted
 significant attention recently at both R&D and engineering/industrial
 level, owing to its special potential to serve as a clean and efficient
 power source for transportation and portable elec. power generation. When
 oxygen obtained from air for use in the fuel cell, it
 is necessary to reduce the transport resistance of oxygen in the cathode.
 The best way to achieve this is to use Pt/C electrocatalyst with a high Pt
 content to reduce the thickness of cathode catalyst layer while keeping
 the Pt loading constant Three Pt/C electrocatalyst samples ($\omega(\text{Pt}) =$
 20%, 40% and 60%) were prepared in aqueous solution by HCHO
 reduction-precipitation and

characterized by BET, XRD, TEM and cyclic voltammogram techniques. The results show that the Pt particles mainly are loaded on the surfaces of carbon particles and in large pores. With the increase of Pt content from 20% to 40%, the pore volume and the surface area of the catalyst reduced. When the Pt content increases to 60%, the pore volume and surface of Pt begin to contribute the total pore volume and surface. The Pt particle size is 2.apprx.4 nm. The higher the Pt/C ratio, the larger the average particle size of Pt. In all the three electrocatalyst samples, Pt crystallites are homogeneously dispersed and adhere to the carbon particles. The performance of the electrocatalyst in proton exchange membrane fuel cell shows that, when the Pt amount is the same on the cathode, the thickness of the catalyst is different with the Pt/C ratios, the higher the ratio, the thinner the layer. Having a thinner catalyst layer is necessary to transport oxygen easily, but too thin catalyst layer makes the electrocatalyst have uneven contact with the membrane. When Pt content is 0.4 mg/cm² on the cathode, 40% Pt/C is the best electrocatalyst.

ST fuel cell electrocatalyst platinum carbon

IT Fuel cells

(Pt/C electrocatalyst for proton exchange membrane fuel cell)

IT Catalysts

(electrocatalysts; Pt/C electrocatalyst for proton exchange membrane fuel cell)

IT 7440-06-4, Platinum, uses 7440-44-0, Carbon, uses

RL: CAT (Catalyst use); USES (Uses)

(Pt/C electrocatalyst for proton exchange membrane fuel cell)

L49 ANSWER 7 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2003:573908 HCAPLUS

DN 140:85705

ED Entered STN: 28 Jul 2003

TI Electrochemical capacitor performance of hydrous ruthenium oxide/mesoporous carbon composite electrodes

AU Jang, Jong H.; Han, Sangjin; Hyeon, Taeghwan; Oh, Seung M.

CS School of Chemical Engineering and Research Center for Energy Conversion and Storage, Seoul National University, Seoul, 151-744, S. Korea

SO Journal of Power Sources (2003), 123(1), 79-85

CODEN: JPSODZ; ISSN: 0378-7753

PB Elsevier Science B.V.

DT Journal

LA English

CC 76-10 (Electric Phenomena)

Section cross-reference(s): 52

AB Ru/C composite materials were prepared by impregnating Ru(III)

acetylacetonate into a mesoporous C (average pore diameter=12 nm, pore volume=3.6 cm³ g⁻¹) and then heat treatment at 320° for 2 h

under an Ar atmospheric. The metallic Ru nanoparticles are converted to pseudo-capacitive hydrous Ru oxide by electrochem. oxidation at 0.75 V (vs. SCE) for 2 h in 2.0M H₂SO₄. The specific capacitance of the composite electrodes, which is the sum of the double-layer capacitance of mesoporous C and the pseudo-capacitance of hydrous Ru oxide, reaches 243 F g⁻¹ with heavy loading. As the loading is increased, however, the degree of Ru use for a pseudo-capacitor becomes poorer, presumably due to a limited conversion to the hydrous oxide form. The rate capability of composite electrodes also decreases with increase in Ru loading, due to an increase in both the equivalent series resistance (ESR) and the overall capacitance value. The ESR enlargement

is caused mainly an increase in the electrolyte resistance within pores which, in turn, results from a pore narrowing with Ru loading Hindered ionic motion in narrowed pores can explain this feature. An increase in the RC time constant with Ru loading is further verified by a.c. impedance measurements.

- ST mesoporous carbon **composite** ruthenium oxide hydrate electrochem capacitor electrode
- IT Ceramic **composites**
Cyclic voltammetry
Electric capacitance
Electric impedance
Electric resistance
Oxidation, electrochemical
Pore size distribution
Surface area
(electrochem. capacitor performance of hydrous ruthenium oxide/mesoporous carbon **composite** electrodes)
- IT Electrolytic capacitors
(electrodes; electrochem. capacitor performance of hydrous ruthenium oxide/mesoporous carbon **composite** electrodes)
- IT Capacitor electrodes
(electrolytic-capacitor; electrochem. capacitor performance of hydrous ruthenium oxide/mesoporous carbon **composite** electrodes)
- IT 14284-93-6, Ruthenium trisacetylacetonate
RL: CPS (Chemical process); NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(electrochem. capacitor performance of hydrous ruthenium oxide/mesoporous carbon **composite** electrodes)
- IT 240414-65-7P, Ruthenium oxide hydrate
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(electrochem. capacitor performance of hydrous ruthenium oxide/mesoporous carbon **composite** electrodes)
- IT 7440-44-0, Carbon, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(porous; electrochem. capacitor performance of hydrous ruthenium oxide/mesoporous carbon **composite** electrodes)

RE.CNT 35 THERE ARE 35 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L49 ANSWER 8 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2002:220467 HCAPLUS

DN 136:249765

ED Entered STN: 22 Mar 2002

TI Manufacture of composites having a carbon matrix with a controlled porosity

IN Blach Vizoso, Ricardo; Fateev, Vladimir-Nikolaevich; Igorevich, Porembskiy-Vladimir; Akimovich, Bogatchev-Eugeniy; Alenxandrovich, Tsypkin-Mikhail

PA David Systems Technology, S.L., Spain

SO PCT Int. Appl., 23 pp.

CODEN: PIXXD2

DT Patent

LA Spanish

IC ICM B29B015-12

ICS B32B027-06; B32B027-12; B32B033-00; H01M004-88

CC 49-1 (Industrial Inorganic Chemicals)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
PI	WO 2002022336	A1	20020321	WO 2000-ES345	20000913	<--
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW					
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG					
	AU 200074228	A	20020326	AU 2000-74228	20000913	<--
	CA 2417605	A1	20030127	CA 2000-2417605	20000913	<--
	EP 1325800	A1	20030709	EP 2000-962548	20000913	<--
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL					
	JP 2004509179	T	20040325	JP 2002-526568	20000913	<--
	BR 2000017322	A	20040706	BR 2000-17322	20000913	<--
	IN 2003KN00106	A	20040814	IN 2003-KN106	20030128	<--
	US 2003214063	A1	20031120	US 2003-359002	20030205	<--
	US 6939493	B2	20050906			
	MX 2003PA02155	A	20041213	MX 2003-PA2155	20030312	<--

PRAI WO 2000-ES345 A 20000913 <--

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2002022336	ICM	B29B015-12
	ICS	B32B027-06; B32B027-12; B32B033-00; H01M004-88
	IPCI	B29B0015-12 [ICM,7]; B29B0015-10 [ICM,7,C*]; B32B0027-06 [ICS,7]; B32B0027-12 [ICS,7]; B32B0033-00 [ICS,7]; H01M0004-88 [ICS,7]
	IPCR	C08J0005-24 [I,C*]; C08J0005-24 [I,A]; B32B0027-06 [I,C*]; B32B0027-06 [I,A]; B32B0027-12 [I,C*]; B32B0027-12 [I,A]; C04B0035-52 [I,C*]; C04B0035-52 [I,A]; C04B0035-83 [I,C*]; C04B0035-83 [I,A]; C04B0038-00 [I,C*]; C04B0038-00 [I,A]; H01M0004-02 [N,C*]; H01M0004-02 [N,A]
	ECLA	B32B027/06; B32B027/12; C04B035/52C; C04B035/83; C04B038/00C; H01M008/02C4C
AU 200074228	IPCI	B29B0015-12 [ICM,7]; B29B0015-10 [ICM,7,C*]; B32B0027-06 [ICS,7]; B32B0027-12 [ICS,7]; B32B0033-00 [ICS,7]; H01M0004-88 [ICS,7]
	IPCR	C08J0005-24 [I,C*]; C08J0005-24 [I,A]; B32B0027-06 [I,C*]; B32B0027-06 [I,A]; B32B0027-12 [I,C*]; B32B0027-12 [I,A]; C04B0035-52 [I,C*]; C04B0035-52 [I,A]; C04B0035-83 [I,C*]; C04B0035-83 [I,A]; C04B0038-00 [I,C*]; C04B0038-00 [I,A]; H01M0004-02 [N,C*]; H01M0004-02 [N,A]
	ECLA	B32B027/06; B32B027/12; C04B035/52C; C04B035/83; C04B038/00C; H01M008/02C4C
CA 2417605	IPCI	B29B0015-12 [ICM,7]; B29B0015-10 [ICM,7,C*]; B32B0033-00 [ICS,7]; B32B0027-06 [ICS,7]; B32B0027-12 [ICS,7]; H01M0004-88 [ICS,7]
	IPCR	C08J0005-24 [I,C*]; C08J0005-24 [I,A]; B32B0027-06 [I,C*]; B32B0027-06 [I,A]; B32B0027-12 [I,C*]; B32B0027-12 [I,A]; C04B0035-52 [I,C*]; C04B0035-52 [I,A]; C04B0035-83 [I,C*]; C04B0035-83 [I,A]; C04B0038-00 [I,C*]; C04B0038-00 [I,A]; H01M0004-02 [N,C*]; H01M0004-02 [N,A]
	ECLA	B32B027/06; B32B027/12; C04B035/52C; C04B035/83; C04B038/00C; H01M008/02C4C
EP 1325800	IPCI	B29B0015-12 [ICM,7]; B29B0015-10 [ICM,7,C*]; B32B0027-06 [ICS,7]; B32B0027-12 [ICS,7]; B32B0033-00 [ICS,7]; H01M0004-88 [ICS,7]
	IPCR	C08J0005-24 [I,C*]; C08J0005-24 [I,A]; B32B0027-06 [I,C*]; B32B0027-06 [I,A]; B32B0027-12 [I,C*]; B32B0027-12 [I,A]; C04B0035-52 [I,C*]; C04B0035-52 [I,A]; C04B0035-83 [I,C*]; C04B0035-83 [I,A]; C04B0038-00 [I,C*]; C04B0038-00 [I,A]; H01M0004-02 [N,C*]; H01M0004-02 [N,A]
	ECLA	B32B027/06; B32B027/12; C04B035/52C; C04B035/83; C04B038/00C; H01M008/02C4C
JP 2004509179	IPCI	C08J0005-24 [ICM,7]; C08L0101-00 [ICS,7]
	IPCR	B32B0027-06 [I,A]; B32B0027-06 [I,C*]; B32B0027-12 [I,A]; B32B0027-12 [I,C*]; C04B0035-52 [I,A]; C04B0035-52 [I,C*]; C04B0035-83 [I,A]; C04B0035-83 [I,C*]; C04B0038-00 [I,A]; C04B0038-00 [I,C*]
	FTERM	4F072/AB10; 4F072/AC01; 4F072/AD23; 4F072/AE00; 4F072/AF01
BR 2000017322	IPCI	B29B0015-12 [ICM,7]; B29B0015-10 [ICM,7,C*]; B32B0027-06 [ICS,7]; B32B0027-12 [ICS,7]; B32B0033-00 [ICS,7]; H01M0004-88 [ICS,7]

IPCR C08J0005-24 [I,C*]; C08J0005-24 [I,A]; B32B0027-06 [I,C*]; B32B0027-06 [I,A]; B32B0027-12 [I,C*]; B32B0027-12 [I,A]; C04B0035-52 [I,C*]; C04B0035-52 [I,A]; C04B0035-83 [I,C*]; C04B0035-83 [I,A]; C04B0038-00 [I,C*]; C04B0038-00 [I,A]; H01M0004-02 [N,C*]; H01M0004-02 [N,A]

ECLA B32B027/06; B32B027/12; C04B035/52C; C04B035/83; C04B038/00C; H01M008/02C4C

IN 2003KN00106 IPCI B29B0015-12 [ICM,7]; B29B0015-10 [ICM,7,C*]

US 2003214063 IPCI C01B0031-00 [ICM,7]

IPCR C08J0005-24 [I,C*]; C08J0005-24 [I,A]; B32B0027-06 [I,C*]; B32B0027-06 [I,A]; B32B0027-12 [I,C*]; B32B0027-12 [I,A]; C04B0035-52 [I,C*]; C04B0035-52 [I,A]; C04B0035-83 [I,C*]; C04B0035-83 [I,A]; C04B0038-00 [I,C*]; C04B0038-00 [I,A]; H01M0004-02 [N,C*]; H01M0004-02 [N,A]

NCL 264/029.100

ECLA B32B027/06; B32B027/12; C04B035/52C; C04B035/83; C04B038/00C; H01M008/02C4C

MX 2003PA02155 IPCI B29B0015-12 [ICM,7]; B29B0015-10 [ICM,7,C*]; B32B0027-06 [ICS,7]; B32B0027-12 [ICS,7]; B32B0033-00 [ICS,7]; H01M0004-88 [ICS,7]

AB The method involves preparing a prepreg and pressing, hardening, and carbonizing the prepreg, which is then subjected to thermal treatment at 70-1,100°. The prepreg is filled with an inert substance comprising a charge and a polymeric ligand in a quantity surpassing the volume of pores of the monolayer tissue. The prepreg is then heated at 160-200° while applying simultaneously a pressure of 1-5 MPa. The method can be used to manufacture composites with a carbonaceous matrix with a variable porosity, such as fuel cell current collectors with electrode aggregates, porous electrochem. electrodes, or filtering elements.

ST carbon matrix composite controlled porosity manuf; fuel cell current collector carbon composite; electrode electrochem carbon composite; filter carbon composite

IT Composites
(carbon; manufacture of composites having carbon matrix with controlled porosity)

IT Fuel cells
(current collectors; manufacture of composites having carbon matrix with controlled porosity for)

IT Carbon fibers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(in manufacture of composites having carbon matrix with controlled porosity)

IT Electrodes
Filters
(manufacture of composites having carbon matrix with controlled porosity for)

IT 7440-44-0, Carbon, uses 7782-42-5, Graphite, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(in manufacture of composites having carbon matrix with controlled porosity)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) College de La Region de L'Amiante; WO 9447999 A 1994

(2) David Systems Technology S L; WO 0038261 2000 HCAPLUS

(3) Dyksterhouse, R; US 4943472 A 1990 HCAPLUS

(4) Johnson Matthey Plc; EP 875524 A 1998 HCAPLUS

(5) Johnson Matthey Plc; WO 0024075 A 2000 HCAPLUS

(6) Toray Industries; EP 885704 A 1998 HCAPLUS

L49 ANSWER 9 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2002:341390 HCAPLUS

DN 136:327704

ED Entered STN: 08 May 2002

TI Noble metal catalyst and method for removal of carbon monoxide from hydrogen-rich gases using it

IN Echigo, Mitsuaki; Tabata, Takeshi; Yamazaki, Osamu

PA Osaka Gas Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM B01J023-46

ICS B01J035-10; C01B003-32; C01B003-38; C10K003-04; H01M008-06

CC 49-1 (Industrial Inorganic Chemicals)

Section cross-reference(s): 52

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002126521	A	20020508	JP 2000-328446	20001027 <--
PRAI	JP 2000-328446		20001027	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2002126521	ICM	B01J023-46
	ICS	B01J035-10; C01B003-32; C01B003-38; C10K003-04; H01M008-06
	IPCI	B01J0023-46 [ICM,7]; B01J0035-10 [ICS,7]; B01J0035-00 [ICS,7,C*]; C01B0003-32 [ICS,7]; C01B0003-38 [ICS,7]; C01B0003-00 [ICS,7,C*]; C10K0003-04 [ICS,7]; C10K0003-00 [ICS,7,C*]; H01M0008-06 [ICS,7]
	IPCR	C01B0003-32 [I,A]; B01J0023-46 [I,C*]; B01J0023-46 [I,A]; B01J0035-00 [I,C*]; B01J0035-10 [I,A]; C01B0003-00 [I,C*]; C01B0003-38 [I,A]; C10K0003-00 [I,C*]; C10K0003-04 [I,A]; H01M0008-06 [I,C*]; H01M0008-06 [I,A]

AB The noble metal catalyst carried on a support shows average pore size (4V/S) 6-9 nm (V = total pore volume measured by Hg impregnation; S = total pore sp. surface area). CO is removed from H-rich gases, which are obtained by reforming of hydrocarbons or alcs., by contacting with the above catalyst in the presence of oxidants. The H-rich gas is useful as a fuel gas for fuel cells.

ST removal carbon monoxide hydrogen rich gas catalytic oxidn; fuel gas hydrogen rich removal carbon monoxide oxidn; noble metal catalyst support pore size oxidn carbon monoxide; hydrogen rich gas reforming carbon monoxide removal fuel cell

IT Oxidation
(catalytic; noble metal oxidation catalyst with controlled pore size for removal of carbon monoxide from hydrogen-rich gases)

IT Fuel gases
(for fuel cells; noble metal oxidation catalyst with controlled pore size for removal of carbon monoxide from hydrogen-rich gases)

IT Fuel cells
Oxidation catalysts
(noble metal oxidation catalyst with controlled pore size for removal of carbon monoxide from hydrogen-rich gases)

IT Fuel gas manufacturing

(reforming; noble metal oxidation catalyst with controlled **pore** size for removal of **carbon** monoxide from hydrogen-rich gases)

IT 1344-28-1, Alumina, uses
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst support; noble metal oxidation catalyst with controlled **pore** size for removal of **carbon** monoxide from hydrogen-rich gases)

IT 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses
 RL: CAT (Catalyst use); USES (Uses)
 (noble metal oxidation catalyst with controlled **pore** size for removal of **carbon** monoxide from hydrogen-rich gases)

IT 1333-74-0P, Hydrogen, preparation
 RL: PUR (Purification or recovery); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (noble metal oxidation catalyst with controlled **pore** size for removal of **carbon** monoxide from hydrogen-rich gases)

IT 630-08-0, Carbon monoxide, processes
 RL: REM (Removal or disposal); PROC (Process)
 (noble metal oxidation catalyst with controlled **pore** size for removal of **carbon** monoxide from hydrogen-rich gases)

IT 7782-44-7, Oxygen, uses
 RL: NUU (Other use, unclassified); USES (Uses)
 (oxidant; noble metal oxidation catalyst with controlled **pore** size for removal of **carbon** monoxide from hydrogen-rich gases)

L49 ANSWER 10 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 1
 AN 2000:218921 HCAPLUS
 DN 132:281537
 ED Entered STN: 05 Apr 2000
 TI Diffusion layer parameters influencing optimal **fuel cell** performance
 AU Jordan, L. R.; Shukla, A. K.; Behrsing, T.; Avery, N. R.; Muddle, B. C.; Forsyth, M.
 CS Department of Materials Engineering, Monash University, Clayton, 3168, Australia
 SO Journal of Power Sources (2000), 86(1-2), 250-254
 CODEN: JPSODZ; ISSN: 0378-7753
 PB Elsevier Science S.A.
 DT Journal
 LA English
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 72
 AB The performance of polymer electrolyte **fuel cells** (PEFCs) is substantially influenced by the morphol. of the gas diffusion layer. Cells utilizing sintered gas diffusion layers made with a low **pore volume** Acetylene Black carbon, at an optimized thickness, showed better performance compared with cells containing Vulcan XC-72R carbon. The cells were optimized using both oxygen and air as oxidants showing that different conditions were required in each case to achieve optimum cell performance. A model, in which the hydrophobicity and porosity of the diffusion layer affect water impregnation and gas diffusion through the gas diffusion layer, is presented to explain the influence of the diffusion layer morphol. on cell performance.
 ST polymer electrolyte **fuel cell** performance diffusion
 IT Diffusion
 (diffusion layer parameters influencing optimal **fuel cell** performance)
 IT Carbon black, uses
 Fluoropolymers, uses

RL: DEV (Device component use); USES (Uses)
(diffusion layer parameters influencing optimal fuel cell performance)

IT Fuel cell electrodes
(gas diffusion; diffusion layer parameters influencing optimal fuel cell performance)

IT Solid state fuel cells
(polymer electrolyte; diffusion layer parameters influencing optimal fuel cell performance)

IT 7440-06-4, Platinum, uses 9002-84-0, Ptfe
RL: DEV (Device component use); USES (Uses)
(diffusion layer parameters influencing optimal fuel cell performance)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Bockris, J; Modern Electrochemistry 1973, V2
- (2) Giorgi, L; Electrochim Acta 1998, V43, P3675 HCAPLUS
- (3) Jordan, L; J Appl Electrochem submitted
- (4) Kinoshita, K; Carbon 1988
- (5) Paganin, V; J Appl Electrochem 1996, V26, P297 HCAPLUS
- (6) Wohr, M; Int J Hydrogen Energy 1998, V23(3), P213 HCAPLUS
- (7) Yi, J; J Electrochem Soc 1999, V146(1), P38 HCAPLUS

L49 ANSWER 11 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1999:709032 HCAPLUS

DN 131:312472

ED Entered STN: 05 Nov 1999

TI Porous support layer for an electrochemical cell

IN Fredley, Robert R.

PA International Fuel Cells Corp., USA

SO PCT Int. Appl., 27 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9956335	A1	19991104	WO 1999-US9235	19990429 <--
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
US 5998058	A	19991207	US 1998-67882	19980429 <--
CA 2330322	A1	19991104	CA 1999-2330322	19990429 <--
AU 9937693	A	19991116	AU 1999-37693	19990429 <--
DE 19983182	T0	20010628	DE 1999-19983182	19990429 <--
JP 2002513200	T	20020508	JP 2000-546409	19990429 <--
PRAI US 1998-67882	A	19980429 <--		
WO 1999-US9235	W	19990429 <--		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 9956335	ICM	H01M008-10

US 5998058 IPCI H01M0008-10 [ICM,6]
 IPCR H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-04 [I,C*]; H01M0008-04 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
 ECLA H01M0008/02C; H01M0008/10B2
 CA 2330322 IPCI H01M0004-86 [ICM,6]
 IPCR H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-04 [I,C*]; H01M0008-04 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
 NCL 429/044.000; 029/592.100; 204/296.000; 429/040.000; 429/041.000; 429/042.000; 429/245.000
 ECLA H01M0008/02C; H01M0008/10B2
 AU 9937693 IPCI H01M0008-10 [ICM,6]
 IPCR H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-04 [I,C*]; H01M0008-04 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
 DE 19983182 IPCI H01M0008-10 [ICM,7]
 IPCR H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-04 [I,C*]; H01M0008-04 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
 JP 2002513200 IPCI H01M0008-10 [ICM,7]; H01M0004-86 [ICS,7]; H01M0004-88 [ICS,7]; H01M0008-04 [ICS,7]
 IPCR H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-04 [I,C*]; H01M0008-04 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
 AB An improved porous support layer includes hydrophobic pores and hydrophilic pores integrated throughout the layer, wherein the hydrophobic pores are coated with a hydrophobic substance and include about 75% to about 95% of the total pore volume of the layer, and the hydrophilic pores comprise about 25% to about 5% of the total pore volume of the layer. A method of manufacture of the layer includes the steps of filling about 25% to about 5% of the pore volume of a carbon fiber substrate layer with a blocking material; applying a hydrophobic substance to the unfilled pore volume of the substrate layer; and heat treating the dried substrate at a temperature adequately high to volatilize or decompose the blocking material and fuse the hydrophobic substance to the pores to produce the porous support layer.
 ST fuel cell porous support layer
 IT Fuel cells
 (porous support layer for fuel cell having improved fluid transport)
 IT Carbon fibers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (substrate; porous support layer for fuel cell having improved fluid transport)
 IT 1314-35-8, Tungsten oxide, uses 1332-29-2, Tin oxide 1343-98-2, Silicon hydroxide 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 11113-84-1, Ruthenium oxide 12627-00-8, Niobium oxide 12710-38-2, Niobium hydroxide 21645-51-2, Aluminum hydroxide, uses 37349-51-2,

Tantalum hydroxide 39311-68-7, Tin hydroxide 56321-86-9, Ruthenium hydroxide 59763-75-6, Tantalum oxide 107477-35-0, Tungsten hydroxide
 RL: TEM (Technical or engineered material use); USES (Uses)
 (wettability preserving compound; porous support layer for fuel cell having improved fluid transport)

RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
 RE

- (1) Deibert; US 3457113 A 1969 HCAPLUS
- (2) Mussell; US 5620807 A 1997 HCAPLUS

L49 ANSWER 12 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 2

AN 1998:581394 HCAPLUS

DN 129:247579

ED Entered STN: 14 Sep 1998

TI Effects of Nafion impregnation on performances of PEMFC electrodes

AU Lee, S. J.; Mukerjee, S.; McBreen, J.; Rho, Y. W.; Kho, Y. T.; Lee, T. H.

CS Dep. Applied Sci., Brookhaven National Lab., Upton, NY, 11973, USA

SO Electrochimica Acta (1998), 43(24), 3693-3701

CODEN: ELCAAV; ISSN: 0013-4686

PB Elsevier Science Ltd.

DT Journal

LA English

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

AB The effect of Nafion loading on the electrode polarization characteristics of a conventional proton exchange membrane (PEM) fuel cell electrode has been investigated in terms of both H₂/O₂ and H₂/air performance. Correlation of Nafion loading with the activation polarization characteristics shows an initial increase of activity up to a loading of 1.3 mg/cm² followed by a more gradual change with maxima at 1.9 mg/cm² for both oxygen and air. This trend correlated well with the decrease in charge transfer resistance and increase in the electrochem. active surface area. The contributions to the linear ohmic polarization region of both the H₂/O₂ and H₂/air performance are predominantly from ionic resistance as well as diffusional contributions in the catalyst layer. Among all the polarization losses those due to mass transport were the highest. Fits using a thin film agglomerate model showed a rapid increase in the film thickness with Nafion loading in the pores of the carbon of the catalyst layer followed by an equilibrium of .apprx.800 Å thickness at a Nafion loading of 1.9 mg/cm². Further addns. caused deeper penetration of this Nafion film into the catalyst layer increasing the diffusional pathways for the reactant gases. These results correlate well with the mass transport characteristics in O₂ and air as well as morphol. characterization of the electrode based on SEM and pore volume distributions.

ST proton exchange membrane fuel cell

electrode; Nafion electrode polarization fuel cell

IT Electric resistance

Electrolytic polarization

Fuel cell electrodes

(effects of Nafion impregnation on performances of PEMFC electrodes)

IT Fuel cells

(proton exchange membrane; effects of Nafion impregnation on performances of PEMFC electrodes)

IT 77950-55-1, Nafion 115

RL: DEV (Device component use); USES (Uses)

(effects of Nafion impregnation on performances of PEMFC electrodes)

RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Barrett, E; J Am Chem Soc 1951, V73, P373 HCAPLUS
- (2) Chan, D; J Power Sources 1994, V50, P261 HCAPLUS
- (3) Dhar, H; J Electroanal Chem 1993, V357, P237 HCAPLUS
- (4) Giner, J; J Electrochem Soc 1969, V116, P1124 HCAPLUS
- (5) Giordano, N; J Electrochim Acta 1991, V36, P1049 HCAPLUS
- (6) Iczkowski, R; J Electrochem Soc 1980, V127, P1433 HCAPLUS
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L49 ANSWER 13 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1998:714596 HCAPLUS

DN 130:27166

ED Entered STN: 11 Nov 1998

TI **Composite**-microfibrous cathodes for metal-air batteries

AU Poole, B.; Smith, R. F.; Putt, R.; Tatarchuk, B. J.

CS Department of Chemical Engineering, Auburn University, AL, 36849, USA

SO Proceedings of the Power Sources Conference (1998), 38th,
342-345

CODEN: PPOCFD

PB National Technical Information Service

DT Journal

LA English

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy
Technology)

Section cross-reference(s): 72

AB The fabrication and performance assessment of an oxygen reduction electrode were investigated using a **composite** electrode structure composed of high surface area activated carbon entrapped in a sinter-bonded matrix of nickel fibers. Electrode phys. properties including thickness, **porosity**, volume/mass fraction of constituent **carbon** and metal fibers, and loading of addnl. electrocatalyst are related to the polarization characteristics and can be independently manipulated. The ability to manipulate independently the phys. properties of the electrode allows addnl. degrees of freedom for design purposes. This paper focuses on the effects of systematically varying some phys. parameters of the oxygen electrode, such as porosity and catalyst loading. Polarization characteristics of the oxygen electrode are shown and discussed. It is demonstrated that there exists an optimal balance of **porosity**, catalyst loading, and **carbon** positioning for efficient oxygen reduction

ST microfibrous cathode **composite** metal air battery

IT Battery cathodes

Cathodic polarization

Reduction, electrochemical

(composite-microfibrous cathodes for metal-air batteries)

IT Fluoropolymers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (~~composite~~-microfibrous cathodes for metal-air batteries)

IT Metallic fibers
 RL: DEV (Device component use); USES (Uses)
 (nickel; ~~composite~~-microfibrous cathodes for metal-air
 batteries)

IT 7440-44-0, Carbon, uses
 RL: DEV (Device component use); USES (Uses)
 (activated; ~~composite~~-microfibrous cathodes for metal-air
 batteries)

IT 18933-05-6, Manganous hydroxide
 RL: CAT (Catalyst use); USES (Uses)
 (~~composite~~-microfibrous cathodes for metal-air batteries)

IT 7440-02-0, Nickel, uses
 RL: DEV (Device component use); USES (Uses)
 (~~composite~~-microfibrous cathodes for metal-air batteries)

IT 7782-44-7, Oxygen, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (~~composite~~-microfibrous cathodes for metal-air batteries)

IT 9002-84-0, Ptfе
 RL: TEM (Technical or engineered material use); USES (Uses)
 (~~composite~~-microfibrous cathodes for metal-air batteries)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
 RE

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- (10) Tatarchuk; US 5304330 1994 HCAPLUS

L49 ANSWER 14 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 3

AN 1998:407365 HCAPLUS

DN 129:83707

ED Entered STN: 03 Jul 1998

TI Hydrogen oxidation characteristics of Raney nickel electrodes with carbon
 black in an alkaline fuel cell

AU Shim, Joong-Pyo; Park, Yong-Suk; Lee, Hong-Ki; Lee, Ju-Seong

CS Dept. of Industrial Chemistry, Hanyang University, Seoul, 133-791, S.
 Korea

SO Journal of Power Sources (1998), 74(1), 151-154

CODEN: JPSODZ; ISSN: 0378-7753

PB Elsevier Science S.A.

DT Journal

LA English

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

AB The characteristics of hydrogen oxidation of Raney nickel electrodes containing
 carbon black in an alkaline fuel cell are investigated in
 6M KOH at 80°. The addition of conductive material to these
 electrodes is shown to increase both the limiting c.d. for hydrogen oxidation
 and the diffusivity of hydroxide ions. The catalytic activity of Raney
 nickel electrodes containing carbon black is about twice that of an undoped
 electrode. A Raney nickel electrode with 8 weight% Vulcan XC-72 exhibits the
 highest performance due to the high conductivity and high diffusivity of

hydroxide ions at the electrode. The pore volume of the micropores increases with increase in the content of carbon black, but the pore volume of the macropores gradually decreases.

ST hydrogen oxidn Raney nickel electrode; fuel cell
hydrogen oxidn nickel electrode

IT Fuel cell electrodes

Fuel cells

Oxidation, electrochemical

(hydrogen oxidation characteristics of Raney nickel electrodes with carbon black in an alkaline fuel cell)

IT Carbon black, uses

RL: DEV (Device component use); USES (Uses)

(hydrogen oxidation characteristics of Raney nickel electrodes with carbon black in an alkaline fuel cell)

IT 7440-02-0, Raney nickel, uses

RL: CAT (Catalyst use); USES (Uses)

(hydrogen oxidation characteristics of Raney nickel electrodes with carbon black in an alkaline fuel cell)

IT 1333-74-0, Hydrogen, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(hydrogen oxidation characteristics of Raney nickel electrodes with carbon black in an alkaline fuel cell)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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L49 ANSWER 15 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 4

AN 1997:378933 HCAPLUS

DN 127:150564

ED Entered STN: 18 Jun 1997

TI Gas transport in sol-gel driven porous carbon aerogels

AU Reichenauer, G.; Fricke, J.

CS Physikalisches Institut der Univ. Wurzburg, Wurzburg, D-97074, Germany

SO Materials Research Society Symposium Proceedings (1997),

464(Dynamics in Small Confining Systems III), 345-350

CODEN: MRSPDH; ISSN: 0272-9172

PB Materials Research Society

DT Journal

LA English

CC 48-6 (Unit Operations and Processes)

Section cross-reference(s): 52, 61, 66, 76

AB Due to their high elec. conductivity, their large sp. surface area and their high

porosity sol-gel derived nanoporous carbons are promising materials for electrodes, e.g. in water desalination systems or fuel cells. In order to optimize their properties with respect to these applications, information is needed about transient and steady state transport through the interconnected pores. Dynamic gas expansion and time resolved permeation measurements allow to determine the relevant quantities, i.e. the permeability, the ratio of gas phase to surface

diffusion and the volume of dead end pores along with the tortuosity. Exptl. data on nanoporous carbons of different d. are presented. All samples investigated were prepared via pyrolysis of resorcinol formaldehyde aerogels. The measurements were performed with different gases below 0.1 MPa.

- ST carbon aerogel porous gas transport; sol gel derived porous carbon aerogel; diffusion adsorption gas transport carbon aerogel; electrode carbon aerogel gas transport
- IT Aerogels
 - (carbon; gas transport in sol-gel driven porous carbon aerogels)
- IT Water purification
 - (desalination, porous electrodes for; gas transport in sol-gel driven porous carbon aerogels)
- IT Adsorption
 - Diffusion
 - Mass transfer
 - Nanostructures
 - Porous materials
 - Xerogels
 - (gas transport in sol-gel driven porous carbon aerogels)
- IT Electrodes
 - Fuel cell electrodes
 - (porous; gas transport in sol-gel driven porous carbon aerogels)
- IT Diffusion
 - (surface; gas transport in sol-gel driven porous carbon aerogels)
- IT 124-38-9, Carbon dioxide, processes 7440-37-1, Argon, processes 7440-59-7, Helium, processes
 - RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 - (gas transport in sol-gel driven porous carbon aerogels)
- IT 108-46-3, Resorcinol, uses
 - RL: NUU (Other use, unclassified); USES (Uses)
 - (gels with formaldehyde; gas transport in sol-gel driven porous carbon aerogels)
- IT 50-00-0, Formaldehyde, uses
 - RL: NUU (Other use, unclassified); USES (Uses)
 - (gels with resorcinol; gas transport in sol-gel driven porous carbon aerogels)
- IT 7440-44-0, Carbon, uses
 - RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
 - (nanoporous; gas transport in sol-gel driven porous carbon aerogels)

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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L49 ANSWER 16 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1997:426672 HCAPLUS

DN 127:178661

ED Entered STN: 10 Jul 1997

TI Studies on improved carbon cathode performance in high rate Li/SOCl₂ cell

AU Choi, Jeong-Ja; Cho, Sung-Baek; Kim, Hee-Sook P.

CS Agency Defense Development, S. Korea

SO Yoop Hakhoechi (1997), 34(3), 225-232

CODEN: YPHJAP; ISSN: 0372-7807

PB Korean Ceramic Society

DT Journal

LA Korean

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

AB The performance characteristics of high-rate discharge Li/SOCl₂ cells are highly affected by carbon cathode. During the cell discharge SOCl₂ reduction takes place at the porous carbon cathode, resulting in the precipitation of reaction products, mainly LiCl, within the pores of the substrate. This leads to eventual passivation of the cathode surface and resulting cell failure. To improved the cathode performance, the authors examined discharge reactions of cathodes (half-cell, 50 mA/cm² constant current) with various surface d. and thickness. The carbon cathode with the optimum capacity for our application is surface d. 0.04 g/cm² and thickness 1.4 mm carbon. The carbon cathode with surface d. 0.04 g/cm² and thickness 1.4 mm exhibits decreased polarization, increased discharge duration time and capacity (A-h/cm²) as compared with that with surface d. 0.04 g/cm² and thickness 0.8 mm. The porosities analyses on the two carbon cathodes show that total pore volume of the carbon cathode with thickness 1.4 mm is larger than that with thickness 0.8 mm. The increased volume of mesopores (0.05-0.5 μm) and macropores (>0.5 μm) is observed with the carbon cathode with thickness 1.4 mm as compared with that with thickness 0.8 mm, which can be related with the observed capacity increase. LiCl crystals, cubic crystallites and fused, plate-like aggregates, and some elemental S were observed as discharge products by EDS and x-ray diffraction.

ST carbon cathode lithium thionyl chloride battery

IT Battery cathodes

(studies on improved carbon cathode performance in high-rate lithium/thionyl chloride batteries)

IT 7440-44-0, Carbon, uses

RL: DEV (Device component use); USES (Uses)

(studies on improved carbon cathode performance in high-rate lithium/thionyl chloride batteries)

L49 ANSWER 17 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 5

AN 1996:447874 HCAPLUS

DN 125:91237

ED Entered STN: 30 Jul 1996

TI Effects of microstructure of carbon support in the catalyst layer on the performance of polymer-electrolyte fuel cells

AU Uchida, Makoto; Fukuoka, Yuko; Sugawara, Yasushi; Eda, Nobuo; Ohta, Akira

CS Technology Laboratory, Matsushita Battery Industrial Company, Limited, Moriguchi, 570, Japan

SO Journal of the Electrochemical Society (1996), 143(7), 2245-2252

CODEN: JESOAN; ISSN: 0013-4651

PB Electrochemical Society

DT Journal

LA English

- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 67, 72
- AB Effects of microstructure of carbon supports for platinum catalyst and perfluorosulfonate-ionomer (PFSI) distribution in the microstructure of the catalyst layer on the consequent performance of polymer-electrolyte **fuel cells**, prepared by a new method based on the process of PFSI colloid formation, were investigated by electrochem. techniques, a mercury pore sizer, N₂ adsorption by Brunauer-Emmett-Teller and Barrett-Joyner-Halenda methods, and CO adsorption. The microstructure of the catalyst layer and its effect on polymer-electrolyte **fuel cell** performance were affected by the contents of PFSI and carbon supports. The PFSI were distributed in the distinctive pores of 0.04 to 1.00 μm . **Pore volume** and **pore diameter** were primarily affected by the **carbon supports**. **Carbon supports** had a large **pore volume** with **pore** diam. less than 8 nm on the surface of the primary particles. Polymer-electrolyte **fuel cell** performance predominantly increased with the sp. volume of **pores** covered with the PFSI in the catalyst layer and with a decrease of the sp. volume of **pores** less than 8 nm without PFSI on the carbon surface.
- ST polymer electrolyte **fuel cell** performance; carbon support microstructure catalyst **fuel cell**; platinum catalyst carbon support microstructure
- IT **Fuel cells**
Fuel-cell electrolytes
(effects of microstructure of carbon support in catalyst layer on performance of polymer-electrolyte **fuel cells**)
- IT Carbon black, uses
RL: DEV (Device component use); USES (Uses)
(effects of microstructure of carbon support in catalyst layer on performance of polymer-electrolyte **fuel cells**)
- IT Ionomers
RL: DEV (Device component use); USES (Uses)
(fluoropolymers, sulfo-containing, electrolyte; effects of microstructure of carbon support in catalyst layer on performance of polymer-electrolyte **fuel cells**)
- IT Anodes
(**fuel-cell**, catalyzed; effects of microstructure of carbon support in catalyst layer on performance of polymer-electrolyte **fuel cells**)
- IT 7440-06-4, Platinum, uses
RL: DEV (Device component use); USES (Uses)
(effects of microstructure of carbon support in catalyst layer on performance of polymer-electrolyte **fuel cells**)
- L49 ANSWER 18 OF 38 INSPEC (C) 2007 IET on STN
- AN 1998:5855078 INSPEC DN A1998-08-8630G-048; B1998-04-8410G-085
- TI Preparation method of ultra low platinum loading electrodes for polymer electrolyte **fuel cells**
- AU Fukuoka, Y.; Uchida, M.; Sugawara, Y.; Eda, N.; Ohta, A. (Technol. Lab., Matsushita Battery Ind. Co. Ltd., Osaka, Japan)
- SO FUEL CELL. 1996 Fuel Cell Seminar. Program and Abstracts, 1996, p. 616-19 of xxvi+794 pp., 5 refs.
Published by: Courtesy Associates, Washington, DC, USA
Conference: Proceedings of Fuel Cell Seminar, Orlando, FL, USA, 17-20 Nov. 1996
Sponsor(s): Fuel Cell Organ. Comm
- AV Annmarie Pittman, Courtesy Associates Inc, 655 15th Street NW, Suite 300, Washington, DC 20005, USA

DT Conference; Conference Article

TC Experimental

CY United States

LA English

AB Polymer electrolyte fuel cells (PEFCs) necessitate platinum (Pt) catalysts for their operating temperature. It is important to enhance the utilization of Pt as regards cost. Reaction sites exist on the Pt surface covered with perfluorosulfonate ionomer (PFSI) in PEFC. PFSI solution was usually impregnated into the catalyst layers to increase the contact areas. The authors proposed a preparation method of the membrane-electrode assembly which emphasized the colloid formation of the PFSI to optimize the network of PFSIs in the catalyst layer. They then focused on the microstructure of the catalyst layer. They recently reported that the PFSI was distributed only in the pores formed between the agglomerates, and the reaction sites were therefore limited to that area. The results indicated that the PEFC system required a particular design compared with a conventional one with liquid electrolytes. They proposed novel structure and/or preparation methods of the catalyst layer to be key issues to get higher Pt utilization. They studied the effect of the carbon support on the fuel cell performance. The performance was improved by an optimal carbon support that has: (i) a larger pore volume (0.04 to 1.0 μm in diameter) able to be distributed the PFSI; and (ii) smaller pore volume (<8 nm in diameter) on the surface of the carbon primary particles. They report here the high dispersion method of the PFSI colloid to lower Pt loading with optimal carbon support

CC A8630G Fuel cells; A8245 Electrochemistry and electrophoresis; A6630H Self-diffusion and ionic conduction in solid nonmetals; A8265J Heterogeneous catalysis at surfaces and other surface reactions; B8410G Fuel cells

CT catalysis; catalysts; electrochemical electrodes; electrochemistry; fuel cells; platinum; polymers; solid electrolytes

ST polymer electrolyte fuel cells; ultra-low platinum loading; catalysts; operating temperature; preparation methods; carbon support; electrochemical performance; PEFC; high dispersion method; optimal carbon support; perfluorosulfonate ionomer; PFSI colloid; Pt

CHI Pt el

ET Pt

L49 ANSWER 19 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1996:678378 HCAPLUS

DN 126:20842

ED Entered STN: 16 Nov 1996

TI Fabrication of high-power electric double-layer capacitors

AU Kibi, Yukari; Saito, Takashi; Kurata, Mitsuyoshi; Tabuchi, Junji; Ochi, Atsushi

CS Materials Development Center, NEC Corporation, 4-1-1 Miyazaki, Miyamae-ku, Kawasaki, 216, Japan

SO Journal of Power Sources (1996), 60(2), 219-224

CODEN: JPSODZ; ISSN: 0378-7753

PB Elsevier

DT Journal

LA English

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

AB The electrochem. behavior of porous activated carbon/ carbon (AC/C) composite electrodes was investigated for high-power elec. double-layer capacitors (EDLCs). It was found that

high-rate charge/discharge characteristics are affected by the resistance of the electrolyte phase in the pores of the electrode. The charge/discharge characteristics were improved by optimizing the pore-size distribution of the electrodes. The size and total volume of the macro-pores in the electrodes were controlled by mixing and burning out polymer spheres. A high-power EDLC (15 V, 470 F), which can discharge as much as 500 A, was fabricated by using improved AC/C composite electrodes.

ST double layer capacitor porous carbon electrode

IT Composites

(activated carbon/carbon; high-power elec. double-layer capacitor with porous carbon composite electrodes)

IT Capacitors

(double layer; high-power elec. double-layer capacitor with porous carbon composite electrodes)

IT Capacitor electrodes

Pore size

(high-power elec. double-layer capacitor with porous carbon composite electrodes)

IT 7440-44-0, Carbon, uses

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(activated; high-power elec. double-layer capacitor with porous carbon composite electrodes)

IT 9003-35-4

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(carbon from; high-power elec. double-layer capacitor with porous carbon composite electrodes)

IT 9011-14-7, Pmma

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(pore-former; high-power elec. double-layer capacitor with porous carbon composite electrodes)

L49 ANSWER 20 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1994:609272 HCAPLUS

DN 121:209272

ED Entered STN: 29 Oct 1994

TI Solid polymer electrolyte fuel cells with improved catalyst

IN Aoyama, Hiroko; Uchida, Makoto; Eda, Nobuo

PA Matsushita Electric Ind Co Ltd, Japan

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M004-86

ICS B01J021-18; B01J023-40; H01M004-90

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 06196171	A	19940715	JP 1992-345928	19921225 <--
	JP 3407320	B2	20030519		
PRAI	JP 1992-345928		19921225	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 06196171	ICM	H01M004-86

ICS B01J021-18; B01J023-40; H01M004-90
 IPCI H01M0004-86 [ICM,5]; B01J0021-18 [ICS,5]; B01J0021-00
 [ICS,5,C*]; B01J0023-40 [ICS,5]; H01M0004-90 [ICS,5]
 IPCR B01J0021-00 [I,C*]; B01J0021-18 [I,A]; B01J0023-40
 [I,C*]; B01J0023-40 [I,A]; H01M0004-86 [I,C*];
 H01M0004-86 [I,A]; H01M0004-90 [I,C*]; H01M0004-90
 [I,A]; H01M0004-92 [I,A]; H01M0004-96 [I,C*];
 H01M0004-96 [I,A]; H01M0008-10 [I,C*]; H01M0008-10
 [I,A]

ECLA H01M004/92; H01M008/10B2

AB The fuel cells use noble metal catalysts dispersed on
 porous fine C powder with ≥ 25 volume% pores
 having a diameter 25-70 Å. Preferably, the C powder have a sp. surface
 area ≥ 800 m²/g, contains no S, and is prepared from C₂H₂. These
 fuel cells have good performance and long lifetime.

ST solid polymer fuel cell catalyst; carbon support
 catalyst fuel cell

IT Carbon black, uses

RL: CAT (Catalyst use); USES (Uses)

(porous carbon supports for noble metal catalyst in
 solid polymer electrolyte fuel cell electrodes)

IT Electrodes

(fuel-cell, porous carbon

supports for noble metal catalyst in solid polymer electrolyte
 fuel cell electrodes)

IT 7440-06-4, Platinum, uses 7440-44-0, Carbon, uses

RL: CAT (Catalyst use); USES (Uses)

(porous carbon supports for noble metal catalyst in
 solid polymer electrolyte fuel cell electrodes)

L49 ANSWER 21 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1990:500919 HCAPLUS

DN 113:100919

ED Entered STN: 16 Sep 1990

TI Porous carbon electrode substrates for
 fuel cells

IN Fukuda, Hiroyuki; Abe, Hikonori; Funabashi, Masayuki

PA Kureha Chemical Industry Co., Ltd., Japan

SO Eur. Pat. Appl., 9 pp.

CODEN: EPXXDW

DT Patent

LA English

IC ICM H01M004-96

ICS C04B038-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy
 Technology)

Section cross-reference(s): 38

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 364297	A2	19900418	EP 1989-310542	19891013 <--
	EP 364297	A3	19910130		
	EP 364297	B1	19940126		
	R: DE, GB, IT				
	JP 02106876	A	19900418	JP 1988-258740	19881014 <--
	CA 2000664	A1	19900414	CA 1989-2000664	19891013 <--
	CA 2000664	C	19950124		
PRAI	JP 1988-258740	A	19881014	<--	

CLASS

PATENT NO. CLASS PATENT FAMILY CLASSIFICATION CODES

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EP 364297      ICM      H01M004-96
                ICS      C04B038-00
                IPCI     H01M0004-96 [ICM,5]; C04B0038-00 [ICS,5]
                IPCR     H01M0004-88 [I,C*]; H01M0004-88 [I,A]; C04B0038-06
                        [I,C*]; C04B0038-06 [I,A]; H01M0004-96 [I,C*];
                        H01M0004-96 [I,A]
JP 02106876    IPCI     H01M0004-88 [ICM,5]
                IPCR     H01M0004-88 [I,C*]; H01M0004-88 [I,A]; C04B0038-06
                        [I,C*]; C04B0038-06 [I,A]; H01M0004-96 [I,C*];
                        H01M0004-96 [I,A]
CA 2000664     IPCI     H01M0004-96 [ICM,5]; C10B0053-00 [ICS,5]
                IPCR     H01M0004-88 [I,C*]; H01M0004-88 [I,A]; C04B0038-06
                        [I,C*]; C04B0038-06 [I,A]; H01M0004-96 [I,C*];
                        H01M0004-96 [I,A]

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AB The **substrates** have a porosity of 50-80%, a pore distribution rate r (the ratio of the **pore volume** attributable to **pores** of diameter 15-60 μm to the total **pore vol** . measured by the Hg porosimeter) $\geq 70\%$, a sp. gas permeability 40-500 mL/cm-h-mm H₂O, a volume resistivity $\leq 20 \text{ m}\Omega\text{-cm}$, and a thermal conductivity $\geq 8.37 \text{ kJ/m-h-}^\circ\text{C}$. The **substrates** are produced by mixing short carbon fibers 5-20 (average diameter 5-20 μm , length 0.005-2.5 mm), coke particles 15-30 (average particle diameter 8-50 μm , C content $\geq 97 \text{ weight}\%$), a binder 20-40 (carbonizing yield 4-70 $\text{weight}\%$ on heating at 900°), and a pore-forming agent 30-60 $\text{weight}\%$ (carbonizing yield $\leq 10 \text{ weight}\%$ on heating at 900°); press molding the mixture under heating; and heating and carbonizing the molded material in an inert atmospheric and/or vacuum at $800\text{-}3000^\circ$. The binder is selected from phenolic resin, petroleum- and/or coal-derived pitch, and/or furfuryl alc. resin. The pore-forming agent is a granular thermoplastic polymer such as poly(vinyl alc.), PVC, polyethylene etc.

ST electrode porous carbon fuel cell

IT Pitch

Phenolic resins, uses and miscellaneous

RL: USES (Uses)

(binders, in porous carbon electrode
substrate manufacture, for fuel cells)

IT Carbon fibers, uses and miscellaneous

Coke

RL: USES (Uses)

(in porous carbon electrode **substrate**
manufacture, for fuel cells)

IT Electrodes

(fuel-cell, porous carbon
substrates for, manufacture of)

IT 25212-86-6, Poly(furfuryl alcohol)

RL: USES (Uses)

(binders, in porous carbon electrode
substrate manufacture, for fuel cells)

IT 7440-44-0

RL: USES (Uses)

(carbon fibers, in porous carbon
electrode **substrate** manufacture, for fuel cells
)

IT 7440-44-0P, Carbon, uses and miscellaneous

RL: PREP (Preparation); USES (Uses)

(electrode **substrates** from porous, manufacture of, for
fuel cells)

IT 9002-86-2, PVC 9002-88-4, Polyethylene 9002-89-5, Poly(vinyl alcohol)
9003-07-0, Polypropene 9003-53-6, Polystyrene 9011-14-7, Poly(methyl

methacrylate)
 RL: USES (Uses)
 (pore-formers, in porous carbon electrode
 substrate manufacture, for fuel cells)

L49 ANSWER 22 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1990:555796 HCAPLUS

DN 113:155796

ED Entered STN: 27 Oct 1990

TI An investigation of the effects of electrode preparation parameters on the performance of phosphoric acid fuel cell cathodes

AU Giordano, N.; Passalacqua, E.; Recupero, V.; Vivaldi, M.; Taylor, E. J.; Wilemski, G.

CS Inst. CNR-TAE, S. Lucia, 98126, Italy

SO Electrochimica Acta (1990), 35(9), 1411-21

CODEN: ELCAAV; ISSN: 0013-4686

DT Journal

LA English

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

AB The effect was studied of electrode fabrication parameters (i.e., Teflon content and sintering temperature) on cathodes for H₃PO₄ fuel cells. The cathodes were evaluated in 98% H₃PO₄ at 170° and the performance was correlated to morphol. characteristics. Expressions and values were derived for the O gain under conditions of activation polarization and joint activation and diffusion polarization. With optimum electrode fabrication parameters, the electrode performance was dominated by activating polarization ≤0.6 A/cm². The underlying factor affecting electrode performance was the volume of acid in the electrocatalyst layer.

ST cathode prepn parameter fuel cell; phosphoric acid fuel cell cathode; Teflon content effect cathode performance; oxygen cathode phosphoric acid fuel cell

IT Carbon paper
 (cathode substrate, for platinum-carbon black-Teflon, for phosphoric acid fuel cell)

IT Carbon black, uses and miscellaneous

RL: USES (Uses)
 (cathodes containing platinum catalyst and, morphol. and absorptive characteristics of, for phosphoric acid fuel cell)

IT Electrolytic polarization
 (of platinum-carbon black cathode for oxygen, of phosphoric acid fuel cell)

IT Pore
 (volume of, of platinum-carbon black cathode)

IT Electric potential
 (cathode, of platinum-carbon black, of phosphoric acid fuel cell, oxygen gain in relation to)

IT Cathodes
 (fuel-cell, catalytic, platinum-carbon black, morphol. and absorptive characteristics of, Teflon content and sintering temperature and catalyst loading effect on)

IT 9002-84-0, Teflon

RL: USES (Uses)
 (binder, platinum-carbon black cathode containing, phosphoric acid fuel cell with)

IT 7440-06-4, Platinum, uses and miscellaneous

RL: CAT (Catalyst use); USES (Uses)
 (catalyst, cathode containing carbon black and, morphol. and absorptive

- characteristics of, for phosphoric acid fuel cell)
- IT 7782-44-7, Oxygen, properties
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (diffusion of, in platinum-carbon black cathode, elec. potential in relation to)
- IT 7664-38-2, Phosphoric acid, uses and miscellaneous
 RL: USES (Uses)
 (electrolyte, platinum-carbon black cathode parameters in, vol . trapping and pore size effect on, for fuel cells)
- L49 ANSWER 23 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 1989:598476 HCAPLUS
 DN 111:198476
 ED Entered STN: 25 Nov 1989
 TI Characterization of the three-phase equilibrium on a porous electrode for fuel cell
 AU Sakaguchi, Masakazu; Ohta, Masatoshi
 CS Fac. Eng., Niigata Univ., Niigata, 950-21, Japan
 SO Journal of the Electrochemical Society (1989), 136(7), 1923-7
 CODEN: JESOAN; ISSN: 0013-4651
 DT Journal
 LA English
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 AB The stability of the 3-phase interface involving the solid catalyst on C carrier, liquid electrolyte solution, and fuel gas in a porous electrode was investigated by a radioisotope tracer method, for electrodes prepared from C carriers with fine structures. A high electrode activity was observed for electrodes prepared with a perovskite-type $\text{LaNi}_{0.99}\text{Cu}_{0.0103}$ catalyst and a secondary particle crowd carrier formed by aggregation of fine particles. The operating life of the electrodes depended water vapor permeation from the aqueous electrolyte into the electrode and the activity decreased abruptly when water vapor permeation was excessive. The reactivity of the electrodes improved by the catalytic activity and by the stabilization of the 3-phase equilibrium in the porous electrode, which was promoted by micropore number and large pore volume of the C carrier.
- ST fuel cell porous electrode equil; carbon
 perovskite catalyst porous electrode; lanthanum nickel copper oxide electrode; perovskite catalyst electrode fuel cell
- IT Carbon black, uses and miscellaneous
 RL: USES (Uses)
 (electrode containing, porous catalytic, three-phase equilibrium on, characterization of, by radioisotope tracer method, for fuel cell)
- IT Electrodes
 (fuel-cell, catalytic, carbon black containing lanthanum nickel copper oxide catalyst, porous, three-phase equilibrium on, characterization of, by radioisotope tracer method)
- IT 9002-84-0
 RL: USES (Uses)
 (binder, porous catalytic electrode containing, three-phase equilibrium on, characterization of, by radioisotope tracer method, for fuel cell)
- IT 123550-54-9, Copper lanthanum nickel oxide ($\text{Cu}_{0.01}\text{LaNi}_{0.9903}$)
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst, porous electrode containing, three-phase equilibrium on, characterization of, by radioisotope tracer method, for fuel cell)
- IT 7782-42-5, Graphite, uses and miscellaneous
 RL: USES (Uses)

(electrode containing, porous catalytic, three-phase equilibrium on, characterization of, by radioisotope tracer method, for **fuel cell**)

IT 124-38-9, Carbon dioxide, uses and miscellaneous 7446-09-5, Sulfur dioxide, uses and miscellaneous 7727-37-9, Nitrogen, uses and miscellaneous 7732-18-5, Water, vapor 10102-44-0, Nitrogen dioxide, uses and miscellaneous
 RL: USES (Uses)
 (oxygen containing, catalytic activity of **fuel cell** electrode in relation to)

L49 ANSWER 24 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1990:162157 HCAPLUS

DN 112:162157

ED Entered STN: 28 Apr 1990

TI Characteristics of conducting polyaniline electrodeposited on **porous carbon substrates**

AU Montemayor, M. C.; Trinidad, F.; Fatas, E.

CS Dep. Chem., Univ. Auton. Madrid, Madrid, 28049, Spain

SO Bulletin of Electrochemistry (1989), 5(11), 824-8

CODEN: BUELE6; ISSN: 0256-1654

DT Journal

LA English

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 72

AB Polyaniline (I) was electrodeposited on porous C electrodes as consistent, thick, highly porous (>70% porosity) films with a resistivity of .apprx. $1.3 \times 10^{-2} \Omega/\text{cm}$ and oxidation capacity of 0.5 F/mol. Cyclic voltammograms of I in 5M aqueous H₂SO₄ at different scan rates showed an oxidation peak at -0.08 V and a reduction peak at -0.32 V, corresponding to the doping and undoping of I with SO₄²⁻, resp. Elemental anal. of .apprx. 100 μm I film showed a doping level of 50%. The high coulombic efficiency of the charge-discharge electrode processes of I on C was demonstrated. The films obtained on porous C are very stable between -0.0 and +0.2 V (vs. Hg/Hg₂SO₄), and >500 cycles were attained with no appreciable change in the coulombic capacity of the electrode. The characteristics of I on porous C, including the large capacitance values and high c.d., make them useful as cathodes of secondary batteries.

ST battery cathode polyaniline carbon **substrate**; electrodeposition polyaniline cathode carbon **substrate**; conducting polymer polyaniline cathode

IT Electric impedance
 (of polyaniline electrodeposited on **porous carbon**, in aqueous sulfuric acid)

IT Polyamines

RL: USES (Uses)

(polyaniline, electrodeposited, on **porous carbon**, characteristics of, for secondary battery cathodes)

IT Electric conductors

(polyaniline, on **porous carbon**, characteristics of)

IT Pore

(volume distribution of, of polyaniline films electrodeposited on **porous carbon**, for battery cathodes)

IT Cathodes

(battery, polyaniline on **porous carbon**, electrodeposited, characteristics of)

IT 25233-30-1, Polyaniline

RL: USES (Uses)

(cathodes from electrodeposited, on **porous carbon**,

characteristics of, for secondary battery)
 IT 7664-93-9, Sulfuric acid, uses and miscellaneous
 RL: USES (Uses)
 (electrolyte, polyaniline cyclic voltammetry in, for secondary
 batteries)
 IT 7440-44-0, Carbon, uses and miscellaneous
 RL: USES (Uses)
 (polyaniline electrodeposited on porous, characteristics of,
 for secondary battery cathodes)

L49 ANSWER 25 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 1989:138680 HCAPLUS
 DN 110:138680
 ED Entered STN: 15 Apr 1989
 TI Thin porous carbon plate and its manufacture for
 fuel cell
 IN Hiramoto, Jiro; Takano, Shigeru; Kaneshiro, Tsuneo
 PA Kawasaki Steel Corp., Japan
 SO Jpn. Kokai Tokkyo Koho, 4 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C04B038-00
 ICS H01M004-88; H01M004-96
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy
 Technology)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 63236778	A	19881003	JP 1987-70946	19870324 <--
PRAI JP 1987-70946		19870324	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 63236778	ICM	C04B038-00
	ICS	H01M004-88; H01M004-96
	IPCI	C04B0038-00 [ICM,4]; H01M0004-88 [ICS,4]; H01M0004-96 [ICS,4]
	IPCR	C04B0038-00 [I,C*]; C04B0038-00 [I,A]; H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0004-96 [I,C*]; H01M0004-96 [I,A]

AB The title plate is a laminate of 2 carbide-bonded carbon-fiber layer with the resp. average length of the fibers in the 2 layers being 0.01-2 and 0.05-5 mm. The plate is prepared by implanting the short fibers on a sheet of a resin having C yield <50%; placing the sheet in a mold; filling the mold with a mixture containing the long fibers 10-60, a binder 10-60, and an organic material 10-60%; hot pressing the mold; and heating the composite in an inert atmospheric Thus, a C plate prepared from a polyacrylate sheet implanted with short pitch-based carbon fibers and a pitch-based long carbon-fiber mixture containing phenolic resin (C yield 50%) 30 and poly(vinyl alc.) (C yield 0%) 30% had a porosity of 68 volume%, a bending strength 160 kg/cm2, a gas permeability 127 mL/cm2-h-mm H2O, and a resistivity of 2.0 + 10-2 Ω-cm, vs. 72%, 155 kg/cm2, 135 mL/cm2-h-mm H2O, and 3.1 + 10-5 Ω-cm for a plate prepared only from the long carbon-fiber mixture The invention plates are useful as electrodes for phosphoric acid fuel cells.

ST phosphoric acid fuel cell electrode; fiber carbon
 fuel cell electrode
 IT Electrodes

(fuel-cell, carbon, containing layers of carbon fibers of different lengths)

IT Carbon fibers, uses and miscellaneous
RL: USES (Uses)
(pitch-based, electrodes containing, carbon, porous, for phosphoric acid fuel cells)

IT 7440-44-0
RL: USES (Uses)
(carbon fibers, pitch-based, electrodes containing, carbon, porous, for phosphoric acid fuel cells)

IT 7440-44-0, Carbon, uses and miscellaneous
RL: USES (Uses)
(electrodes, containing carbon fibers, porous, for phosphoric acid fuel cells)

L49 ANSWER 26 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN
AN 1988:153663 HCAPLUS
DN 108:153663
ED Entered STN: 30 Apr 1988
TI Manufacture of fuel-cell electrode substrates
IN Kato, Mikiro; Sunami, Yoshihiko
PA Sumitomo Metal Industries, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01M004-88
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 63000967	A	19880105	JP 1986-143516	19860619 <--
PRAI JP 1986-143516		19860619	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 63000967	ICM	H01M004-88
	IPCI	H01M0004-88 [ICM,4]
	IPCR	H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0004-96 [I,C*]; H01M0004-96 [I,A]

AB Carbon-fiber mats are impregnated with a binder and a pore-forming agent, hot pressed, hardened, and carbonized or graphitized to obtain the title **substrates**. Thus, 3 0.7-mm-thick epoxy-bonded carbon-fiber mats (base weight 50 g/m²) were impregnated in a mixture of novolak resin and hexamethylenetetramine at a mat:resin:hexamethylenetetramine weight ratio of 20:30:50, dried, stacked, pressed at 180° and 80 kg/cm² for 30 min, sandwiched between graphite plate at 0.1-kg/cm² load, hardened for 5 h, embedded in coke powders, and heated in a N flow at 12°/h to 1000° to obtain a 0.50-mm-thick electrode **substrate** of 68 volume% porosity with >70% pores of 4-13-μ diameter, a gas permeability of 13 mL/min-cm²-torr and a bending strength of 145 kg/cm².

ST **fuel cell** electrode carbon **substrate**;
hexamethylenetetramine carbon electrode **substrate**; novolak resin carbon electrode **substrate**

IT Epoxy resins, uses and miscellaneous
Phenolic resins, uses and miscellaneous
RL: USES (Uses)

(binders, in manufacture of **fuel-cell electrode substrate**)

IT Carbon fibers, uses and miscellaneous
 RL: USES (Uses)
 (mats, impregnated with binders and pore-forming agents, in manufacture of **fuel-cell electrode substrates**)

IT Electrodes
 (fuel-cell, carbon-fiber, manufacture of)

IT 7440-44-0
 RL: USES (Uses)
 (carbon fibers, mats, impregnated with binders and pore-forming agents, in manufacture of **fuel-cell electrode substrates**)

IT 7782-42-5, Graphite, uses and miscellaneous
 RL: USES (Uses)
 (in manufacture of **fuel-cell electrode substrate**)

IT 100-97-0, Hexamethylenetetramine, uses and miscellaneous 7803-63-6, Ammonium hydrogen sulfate 12125-02-9, Ammonium chloride, uses and miscellaneous
 RL: USES (Uses)
 (pore-forming agents, in manufacture of **fuel-cell electrode substrate**)

L49 ANSWER 27 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1987:499791 HCAPLUS

DN 107:99791

ED Entered STN: 19 Sep 1987

TI Bipolar electrodes for zinc-bromine batteries

IN Hirota, Akihiko; Fujii, Toshinori

PA Meidensha Electric Mfg. Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 9 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M004-86

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 62128449	A	19870610	JP 1985-267413	19851129 <--
PRAI	JP 1985-267413		19851129	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 62128449	ICM	H01M004-86
	IPCI	H01M0004-86 [ICM,4]
	IPCR	H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0004-96 [I,C*]; H01M0004-96 [I,A]; H01M0010-36 [I,C*]; H01M0010-36 [I,A]

AB The cathodic side of the title electrodes has a surface layer with 1-11 nm-diameter pores (with maximum pore-size distribution of 6 nm), a pore surface area of >30 m²/g, and a pore volume >80 mm³/g. Porous C-fiber sheets, porous glassy C, and porous Ti are used as the surface layer. Woven carbon-fiber sheets of various pore structure were hot pressed at 140° and 100 kg/cm² on substrates of 50:15:35 (weight ratio) polyethylene-carbon black-graphite composites to obtain bipolar electrodes with the composite side as the anodic side. The obtained electrodes had

about the same resistivity, but electrodes of the invention had lower overpotential than control electrodes when discharged in a ZnBr₂ + (0.4-1.0) M Br electrolyte.

ST zinc bromine battery bipolar electrode; porosity bipolar electrode bromine battery; carbon bipolar electrode bromine battery

IT Electrodes

(battery, bipolar, zinc-bromine, carbon plates with porous cathodic sides for)

IT 7440-32-6, Titanium, uses and miscellaneous

RL: USES (Uses)

(bipolar carbon electrodes with cathodic sides of porous, for zinc-bromine batteries)

IT 7440-44-0, Carbon, uses and miscellaneous

RL: USES (Uses)

(bipolar electrodes, with porous cathodic sides, for zinc-bromine batteries)

L49 ANSWER 28 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1987:179887 HCAPLUS

DN 106:179887

ED Entered STN: 29 May 1987

TI Inorganic nonaqueous electrolyte batteries

IN Kajii, Osamu

PA Hitachi Maxell, Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M006-14

ICS H01M004-06

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 62035459	A	19870216	JP 1985-175011	19850808 <--
	JP 07044035	B	19950515		
PRAI	JP 1985-175011		19850808	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 62035459	ICM	H01M006-14
	ICS	H01M004-06
	IPCI	H01M0006-14 [ICM,4]; H01M0004-06 [ICS,4]
	IPCR	H01M0004-06 [I,C*]; H01M0004-06 [I,A]; H01M0006-14 [I,C*]; H01M0006-14 [I,A]

AB A porous C sheet-carbon fiber cloth

composite is rolled to form a cathode coil for an alkali metal-oxyhalide battery. The cloth can be active carbon fiber cloth and has a porosity of 80-98 volume%. A mixture of acetylene black-10% graphite 100, 60% aqueous PTFE dispersion 20, MeOH 120, and water 250 weight parts was pressed on a stainless steel screen and dried in vacuum to form a 0.8-mm-thick sheet of 80 volume% porosity. This sheet was stacked with a 0.7-mm-thick phenolic resin-based active carbon-fiber cloth of 92 volume% porosity, rolled to form a cathode coil, inserted into a battery case having a Li anode attached to its inner side and a separator separating the electrodes, a 1.2M LiAlCl₄-SOCl₂ electrolyte was injected into the case, and the case was sealed to obtain a battery. When discharged through a 50-Ω load at 20 and

-40°, this battery had by a resp. factor of 1.4 and 2 longer discharge times that a control battery.

ST thionyl chloride battery cathode coil; carbon composite battery cathode coil

IT Carbon fibers, uses and miscellaneous

RL: USES (Uses)

(active, cathode collectors from composites of carbon sheets and, thionyl chloride, for batteries)

IT Carbon black, uses and miscellaneous

RL: USES (Uses)

(cathode collectors from composites of carbon-fiber cloth and mixture containing, thionyl chloride, for batteries)

IT Cathodes

(battery, collectors, thionyl chloride, porous carbon sheet/carbon-fiber cloth composites for)

IT 7440-44-0

RL: USES (Uses)

(carbon fibers, active, cathode collectors from composites of carbon sheets and, thionyl chloride, for batteries)

IT 7782-42-5, Graphite, uses and miscellaneous

RL: USES (Uses)

(cathode collectors from composites of carbon-fiber cloth and mixture containing, thionyl chloride, for batteries)

L49 ANSWER 29 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1987:179886 HCAPLUS

DN 106:179886

ED Entered STN: 29 May 1987

TI Inorganic nonaqueous electrolyte batteries

IN Kajii, Osamu

PA Hitachi Maxell, Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M006-14

ICS H01M004-06

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 62035458	A	19870216	JP 1985-175010	19850808 <--
	JP 07044034	B	19950515		
PRAI	JP 1985-175010		19850808	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 62035458	ICM	H01M006-14
	ICS	H01M004-06
	IPCI	H01M0006-14 [ICM,4]; H01M0004-06 [ICS,4]
	IPCR	H01M0004-06 [I,C*]; H01M0004-06 [I,A]; H01M0006-14 [I,C*]; H01M0006-14 [I,A]
	ECLA	H01M004/06; H01M006/14

AB A porous C sheet-porous metal sheet composite is rolled to form a cathode coil for use in an alkali metal-oxyhalide battery. The metal sheet can be a metal sponge or a metal-coated nonwoven polyolefin cloth. A 0.8-mm-thick C sheet of 80 volume% porosity and a 0.4-mm-thick Ni-coated nonwoven polypropylene cloth of 95 volume% porosity were

stacked and rolled to form a cathode coil, inserted into a battery case having a Li anode attached to its inner side and a separator separating the electrodes, a 1.2M LiAlCl₄-SOCl₂ catholyte was injected into the case, and the case was sealed to obtain a battery. When discharged through a 50-Ω load at 20 and -4.0°, this battery had by a resp. factor of 1.4 and 2.0 longer discharge times than a control battery.

ST thionyl chloride battery cathode coil; carbon nickel battery cathode coil
IT Cathodes

(battery, collectors, thionyl chloride, porous carbon
-nickel composites for)

IT 7440-02-0, Nickel, uses and miscellaneous

RL: USES (Uses)

(cathode collectors from porous composites of
carbon and, thionyl chloride, for batteries)

IT 7440-44-0, Carbon, uses and miscellaneous

RL: USES (Uses)

(cathode collectors from porous composites of
nickel and, thionyl chloride, for batteries)

IT 9003-07-0, Polypropylene

RL: USES (Uses)

(nonwoven cloth, cathode collectors from porous
composites of carbon and nickel-coated, thionyl
chloride, for batteries)

L49 ANSWER 30 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1987:410480 HCAPLUS

DN 107:10480

ED Entered STN: 11 Jul 1987

TI Manufacture of porous carbon plastic electrodes

IN Ando, Yasuo

PA Meidensha Electric Mfg. Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M004-96

ICS H01M004-88

CC 52-2 (Electrochemical, Radiational, and Thermal Energy
Technology)

Section cross-reference(s): 38, 72

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 61284060	A	19861215	JP 1985-124084	19850610 <--
PRAI	JP 1985-124084		19850610	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 61284060	ICM	H01M004-96
	ICS	H01M004-88
	IPCI	H01M0004-96 [ICM,4]; H01M0004-88 [ICS,4]
	IPCR	H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0004-96 [I,C*]; H01M0004-96 [I,A]

AB **Sheets** of a mixture of a polymer 100, carbon black 20-120, and SiO₂ 10-100 (carbon black + SiO₂ ≤140) parts containing 150-550 fine pore-forming agent/100 weight parts C black + SiO₂ are melted at 100-250° on ≥1 side, press formed, and treated with an agent to extract the pore-forming agent to give porous carbon-plastic electrodes. Sholex S6008 (polyethylene) 100 was mixed with carbon black 65, SiO₂ 60, and DOP 300 weight parts, melted, rolled

at 180°, and treated 2 h with MeCOME to remove DOP to give porous electrode having porosity 0.92 mL/g and resistivity 1.611 Ω -cm. One side of the prepared electrode was heat treated at roll speed 1 cm/min and 5 kg/cm² to give an electrode having pores on 1 and no pores on the other side. The porous electrode had excellent water wettability and was useful for batteries and electrolytic cells.

- ST carbon plastic porous electrode; silica carbon polyethylene porous electrode; battery porous carbon plastic electrode
- IT Carbon black, uses and miscellaneous
RL: USES (Uses)
(electrodes from polyethylene and, porous, for batteries and electrolytic cells)
- IT Electrodes
(battery, porous carbon-polyethylene, manufacture of)
- IT 7631-86-9, Silica, uses and miscellaneous
RL: USES (Uses)
(electrodes containing, porous carbon-plastic, for batteries and electrolytic cells)
- IT 9002-88-4, Polyethylene
RL: USES (Uses)
(electrodes from carbon and, porous, for batteries and electrolytic cells)
- IT 117-81-7, Dioctyl phthalate 7447-40-7, Potassium chloride, uses and miscellaneous 7647-14-5, Sodium chloride, uses and miscellaneous 9002-89-5, Poly(vinyl alcohol) 25322-68-3, Polyethylene glycol
RL: USES (Uses)
(pore-forming agent, in preparation of porous carbon-plastic electrodes, for batteries and electrolytic cells)

L49 ANSWER 31 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN
AN 1987:70318 HCAPLUS
DN 106:70318
ED Entered STN: 07 Mar 1987
TI Apparatus for energy storage
IN Yoshida, Akihiko; Nishino, Atsushi; Tanahashi, Ichiro
PA Matsushita Electric Industrial Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01G009-00
ICS H01M004-02; H01M006-16; H01M010-40
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 61214417	A	19860924	JP 1985-54911	19850319 <--
	JP 06018156	B	19940309		
PRAI	JP 1985-54911		19850319	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 61214417	ICM	H01G009-00
	ICS	H01M004-02; H01M006-16; H01M010-40
	IPCI	H01G0009-00 [ICM,4]; H01M0004-02 [ICS,4]; H01M0006-16

[ICS,4]; H01M0010-40 [ICS,4]; H01M0010-36 [ICS,4,C*]
 IPCR H01M0006-16 [I,C*]; H01M0006-16 [I,A]; H01G0009-00
 [I,C*]; H01G0009-00 [I,A]; H01G0009-022 [I,C*];
 H01G0009-038 [I,A]; H01G0009-058 [I,C*]; H01G0009-058
 [I,A]; H01M0004-02 [I,C*]; H01M0004-02 [I,A];
 H01M0010-36 [I,C*]; H01M0010-40 [I,A]

AB Polarized porous carbon-fiber electrode with
 pores <2 nm in diameter contributing >50% of the total pore
 volume is used in an apparatus containing an ethereal electrolyte solution, a
 separator, and a counterelectrode for energy storage. The ethereal
 solvent is ≥ 1 of 1,3-dioxolane, MeOC₂H₄OMe, and THF; the
 electrolyte is ≥ 1 of Et₄NClO₄, Et₄NNO₃, and LiClO₄. The
 counterelectrode is another polarized carbon-fiber electrode or a
 nonpolarized (Li) electrode. Thus, a phenolic-resin-
 fiber cloth was carbonized to obtain an active carbon-fiber cloth
 having a sp. surface area of 1200 m²/g and 130 g/m². A 300- μ Al layer
 was plasma sprayed on 1 side of the cloth, and the cloth was punched to
 form 2 10-mm-diameter polarized electrodes. These electrodes were assembled
 with a 10% Et₄NClO₄ in 1:1 propylene carbonate-MeOC₂H₄OMe electrolyte to
 form a capacitor for energy storage. A secondary battery was prepared from
 1 of the prepared electrode with a Li-occluded Sn-Pb alloy anode and a 10%
 LiClO₄ in 1:1 propylene carbonate-1,3-dioxolane electrolyte.
 ST battery carbon fiber cloth cathode; elec capacitor carbon fiber cloth
 IT Carbon fibers, uses and miscellaneous
 RL: USES (Uses)
 (activated, electrodes, for capacitors and secondary batteries)
 IT Electric capacitors
 (double-layer, active carbon-fiber cloth electrodes for)
 IT Cathodes
 (battery, porous active carbon-fiber cloth)
 IT 7440-44-0
 RL: USES (Uses)
 (carbon fibers, activated, electrodes, for capacitors and secondary
 batteries)

L49 ANSWER 32 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 1985:598582 HCAPLUS
 DN 103:198582
 ED Entered STN: 14 Dec 1985
 TI Metal-bromine secondary battery
 PA Meidensha Electric Mfg. Co., Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 6 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M004-96
 ICS H01M012-08
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy
 Technology)
 Section cross-reference(s): 38

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 60117560	A	19850625	JP 1983-223262	19831129 <--
JP 04049748	B	19920812		
PRAI JP 1983-223262		19831129	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 60117560	ICM	H01M004-96

ICS H01M012-08
 IPCI H01M0004-96 [ICM,4]; H01M0012-08 [ICS,4]; H01M0012-00 [ICS,4,C*]
 IPCR H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0004-96 [I,C*]; H01M0004-96 [I,A]; H01M0012-00 [I,C*]; H01M0012-08 [I,A]

AB A cathode of a metal-Br battery has a Brunauer-Emmet-Teller sp. surface area $A > 100 \text{ m}^2/\text{g}$ and a carbon-fiber-sheet backside having a pore volume $V > 0.1 \text{ cm}^3/\text{g}$ for pores of $3.0\text{-}8.0\text{-}\mu$ diameter. Thus, sheets of chemical treated porous carbon fibers with A of $0.6\text{-}1572.7 \text{ m}^2/\text{g}$ and V of $0.174\text{-}0.835 \text{ cm}^3/\text{g}$ were hot pressed to a mixture of 100 high-d. polyethylene [9002-88-4] (d. 0.94 g/cm^3) and 50 weight parts carbon black to form cathodes with A of $2.18\text{-}603.14 \text{ m}^2/\text{g}$. Potentials for electrodes having carbon fibers with $V = 0.174, 0.365, 0.558, \text{ and } 0.835 \text{ cm}^3/\text{g}$ at 40 mA/cm^2 discharge in $0.4\text{-}1.0 \text{ M Br}$ were $0.445, 0.610, 0.726, \text{ and } 0.781 \text{ V}$ (vs. Ag/AgCl), resp. Performances of Zn-Br batteries using these electrodes were also determined.

ST zinc bromine battery; bromine polyethylene carbon fiber cathode

IT Carbon black, uses and miscellaneous

Carbon fibers

RL: USES (Uses)

(cathodes containing, bromine, for batteries)

IT Cathodes

(battery, bromine, carbon-fiber sheet and carbon black and polyethylene)

IT 9002-88-4

RL: USES (Uses)

(cathodes containing high-d., bromine, for batteries)

IT 7726-95-6, uses and miscellaneous

RL: USES (Uses)

(cathodes, carbon-fiber sheet and carbon black and polyethylene, for batteries)

L49 ANSWER 33 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1985:424969 HCAPLUS

DN 103:24969

ED Entered STN: 27 Jul 1985

TI Metal-halogen battery

PA Toyobo Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M004-96

ICS H01M012-08

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 60023963	A	19850206	JP 1984-126985	19840620 <--
PRAI	JP 1984-126985		19840620	<--	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 60023963	ICM	H01M004-96
	ICS	H01M012-08
	IPCI	H01M0004-96 [ICM,4]; H01M0012-08 [ICS,4]; H01M0012-00 [ICS,4,C*]
	IPCR	H01M0004-96 [I,C*]; H01M0004-96 [I,A]; H01M0012-00

[I,C*]; H01M0012-08 [I,A]

AB The cathode of the title battery is prepared by hot pressing a carbon-plastic mix with a **sheet** containing polyolefin **resin** fibers and porous carbon fibers (diameter 30-1000 Å, pore volume >0.1 cm³/g, d. >0.1 g/cm³, elec. resistivity <0.05 Ω-cm). Thus, cathodes were prepared by impregnating cellulose fibers in NH₄ phosphate, heating the fibers at 850° for 90 min, adding polypropene fibers and a binder, pressing between rolls at 150° to form a **sheet**, and by hot pressing the **sheet** with a carbon-plastic powder mix. A flow battery containing this cathode (10 + 10 + 0.1 cm), a Zn anode, a separator, an anolyte of 3 ZnBr₂ and 4M KCl, and a catholyte of 3 ZnBr₂, 4 KCl, and 3M Br had a higher cathode potential than a conventional battery even after the decrease of Br concentration

ST zinc bromine battery cathode; carbon bromine battery cathode; polypropene fiber bromine battery cathode

IT Polypropene fibers, uses and miscellaneous
RL: USES (Uses)
(cathodes from carbon fibers and, bromine, battery)

IT Carbon fibers
RL: USES (Uses)
(cathodes from polypropene fibers and, bromine, battery)

IT Cathodes
(battery, bromine, carbon fiber-polypropene fiber)

IT 7726-95-6, uses and miscellaneous
RL: USES (Uses)
(cathodes, carbon fiber-polypropene fiber, battery)

L49 ANSWER 34 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1986:132958 HCAPLUS

DN 104:132958

ED Entered STN: 19 Apr 1986

TI Manufacture of a **composite** battery cathode

IN North, John Malcolm

PA United Kingdom Atomic Energy Authority , UK

SO Fr. Demande, 7 pp.

CODEN: FRXXBL

DT Patent

LA French

IC ICM H01M004-60

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 72

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 2564248	A1	19851115	FR 1985-7226	19850513 <--
	FR 2564248	B1	19940805		
	US 4589197	A	19860520	US 1985-726661	19850424 <--
	JP 60253174	A	19851213	JP 1985-102507	19850514 <--
	JP 07022023	B	19950308		
PRAI	GB 1984-12304	A	19840514		<--

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
FR 2564248	ICM	H01M004-60
	IPCI	H01M0004-60 [ICM,4]; H01M0004-36 [ICM,4,C*]
	IPCR	H01M0004-02 [I,C*]; H01M0004-02 [I,A]; H01M0004-04 [I,C*]; H01M0004-04 [I,A]; H01M0006-18 [I,C*]; H01M0006-18 [I,A]; H01M0010-36 [I,C*]; H01M0010-36

- [I,A]; H01M0010-38 [I,A]; H01M0010-40 [I,A]
ECLA H01M004/02; H01M010/40B
US 4589197 IPCI H01M0004-62 [ICM,4]; H01M0006-18 [ICS,4]
IPCR H01M0004-02 [I,C*]; H01M0004-02 [I,A]; H01M0004-04
[I,C*]; H01M0004-04 [I,A]; H01M0006-18 [I,C*];
H01M0006-18 [I,A]; H01M0010-36 [I,C*]; H01M0010-36
[I,A]; H01M0010-38 [I,A]; H01M0010-40 [I,A]
NCL 029/623.100; 429/217.000; 429/307.000
JP 60253174 IPCI H01M0010-36 [ICM,4]
IPCR H01M0004-02 [I,C*]; H01M0004-02 [I,A]; H01M0004-04
[I,C*]; H01M0004-04 [I,A]; H01M0006-18 [I,C*];
H01M0006-18 [I,A]; H01M0010-36 [I,C*]; H01M0010-36
[I,A]; H01M0010-38 [I,A]; H01M0010-40 [I,A]
- AB A composite battery cathode is prepared by shaping a cathode active material (V6O13) and a polymer [e.g., poly(propylene oxide) or poly(ethylene oxide) (I)], which can form a complex with a Li salt (LiF3CSO3), into a film. This cathode is used in a battery with a Li anode and a Li salt-polymer complex electrolyte. Thus, (I)g.LiF3CSO3 and V6O13 in MeCN were mixed with acetylene black and placed on a Ni support and MeCN was evaporated to leave a 50- μ film cathode containing V6O13 22.5, (I)g.LiF3CSO3 25, carbon black 2.5 volume%, and porosity 50%. The film was compressed to remove porosity. The cathode as used in a battery having an .apprx.300- μ foil anode and an .apprx.50- μ (I)g.LiF3SO3 electrolyte. At 130°, the battery had a discharge current of 0.25 mA/cm², charge current of 0.125 mA/cm² at 1.7-3.25 V, and a nominal capacity of 1.25 mA-h/cm².
- ST lithium trifluoromethanesulfonate battery cathode electrolyte; vanadium oxide battery cathode; lithium polyoxyethylene vanadium oxide battery; polyoxyalkylene lithium vanadium oxide battery
- IT Batteries, secondary
(solid-electrolyte, lithium-vanadium oxide, containing lithium trifluoromethanesulfonate and polyethylene glycol complex)
- IT 12037-42-2
RL: USES (Uses)
(cathodes, containing lithium trifluoromethanesulfonate-poly(ethylene oxide) complexes, for lithium solid-electrolyte batteries)
- IT 7439-93-2D, complex with poly(ethylene oxide) 25322-68-3D, lithium complexes
RL: USES (Uses)
(vanadium oxide cathodes containing, for lithium solid-electrolyte batteries)
- L49 ANSWER 35 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 6
AN 1985:52967 HCAPLUS
DN 102:52967
ED Entered STN: 09 Feb 1985
TI Application of carbon fiber felts to air electrodes for fuel cells. Activity, deposited states of metal catalysts, and pore structure
AU Kera, Yoshiya; Okahara, Haruo; Azuma, Isao; Tonomura, Tokuzo
CS Fac. Sci. Eng., Kinki Univ., Osaka, 577, Japan
SO Denki Kagaku oyobi Kogyo Butsuri Kagaku (1984), 52(9), 609-13
CODEN: DKOKAZ; ISSN: 0366-9297
DT Journal
LA Japanese
CC 72-3 (Electrochemistry)
Section cross-reference(s): 66
AB Active C fiber felts (Toyobe, KF-1000 and 1500) with Au, Pt, and Pd metal deposits were used in air electrodes in Zn-air batteries and their discharge properties examined over a long time period. The felts with Pt

and Pd deposits showed higher activity than those with Au, and KF-1000 felt gave more stable discharge characteristics than KF-1500. On KF-1000 with Pd, the discharge curve obtained was the same, independent of the amount of the deposit between 5 and 190 mg/g-felt, while on KF-1000 with Pt, the discharge curve varied extensively with the amount of the deposit between 20 and 130 mg/g-felt. The activity of the felt with 5 mg Pd/g-felt was comparable with that of the 100 mg Pt/g-felt. Particle size of the metal deposits was determined by SEM to be .apprx.0.2-0.5 μm on the 190 mg Pd/g-felt sample, but much smaller, only 0.03 μm or less, on the 130 mg Pd/g-felt sample. Adsorption of Pd ion from aqueous solution onto

KF-1000

differed greatly from that of Pt ion. Pore size distribution in KF-1000 felt varied by a heat treatment at 1000°. The volume of pores having 10-12 Å diameter decreased greatly, while that of pores with 15-17 Å diameter increased. The change was accompanied by a decrease in the electrode activity. The results indicated that KF-1000 felt has excellent adsorption property and pore structure that make it suitable for use as an air electrode material.

ST air electrode carbon fiber metal; zinc air battery electrode; gold carbon fiber air electrode; platinum carbon fiber air electrode; palladium carbon fiber air electrode; adsorption metal deposit carbon fiber; particle size metal air electrode; pore structure carbon fiber electrode

IT Carbon fibers

RL: USES (Uses)

(air electrodes with metal deposits with, for zinc-air battery)

IT Electrodes

(air, with carbon fibers, activity, deposit state of metal catalysts and pore structure in relation to)

IT Particle size

(of metal deposits, air electrodes in relation to)

IT Adsorption

(of palladium and platinum, by carbon fibers, air electrodes in relation to)

IT Pore

(structure of, of carbon fibers, air electrodes in relation to)

IT Catalysts and Catalysis

(electrochem., metal deposits)

IT 7440-66-6, uses and miscellaneous

RL: USES (Uses)

(anodes, in air battery)

IT 7440-05-3, uses and miscellaneous 7440-06-4, uses and miscellaneous

7440-57-5, uses and miscellaneous

RL: USES (Uses)

(carbon fiber with deposits of, for air electrode for zinc-air battery)

L49 ANSWER 36 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1984:554822 HCAPLUS

DN 101:154822

ED Entered STN: 27 Oct 1984

TI Porous cathodes for lithium primary cells

AU Reddy, T. B.; Thurston, E. P.

CS Power Convers., Inc., Elmwood Park, NJ, 07407, USA

SO Proceedings - Electrochemical Society (1984), 84-8(Porous Electrodes), 121-32

CODEN: PESODO; ISSN: 0161-6374

DT Journal

LA English

CC 52-2 (Electrochemical, Radiational, and Thermal Energy

Technology)

- AB PTFE-acetylene black **composites** are commonly used as cathodes for Li primary cells using soluble depolarizers (Li/SO₂, Li/SOCl₂, etc.). Under conditions of high-rate and/or low-temperature discharge, the capacity of these cells is limited by clogging of the outer cathode pores with the precipitate formed during discharge. Results of a study aimed at improving the performance of these cathodes by addition of other C types to the cathode are described. These materials were selected to alter the conductivity, surface area, and/or **pore volume** of the cathode. Laboratory tests of these cathodes were carried out and the results are reported.
- ST lithium battery carbon black cathode
- IT Carbon black, uses and miscellaneous
- RL: USES (Uses)
- (cathodes, battery, evaluation of porous lithium-)
- IT Cathodes
- (battery, carbon, porous lithium-, evaluation of)

L49 ANSWER 37 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1967:25336 HCAPLUS

DN 66:25336

OREF 66:4775a,4778a

ED Entered STN: 12 May 1984

TI Carbon electrodes for **fuel cells**

AU Vohler, Otto; Martina, R.

CS Tech. Hochsch., Vienna, Austria

SO Allgemeine und Praktische Chemie (1966), 17(8), 500-4

CODEN: APKCAR; ISSN: 0002-595X

DT Journal

LA German

CC 77 (Electrochemistry)

AB In **fuel cell** electrodes it is important that the pore size be uniform and that there be a min. of dead-end pores. This can be achieved by the sintering of cellulose compactions. Different pore structures can be obtained by variation of the pressure of compaction; the maximum pore radius decreases reproducibly with increasing pressure. With increasing d. of the sintered body the **pore volume**, maximum pore radius, gas permeability, and sp. resistivity decrease while the surface area/g. and the strength increase. Electrodes having adjacent layers with different size pores may be prepared by pressing 1st a part of the compaction at a high pressure and then the entire compaction at a lower pressure. A catalyst may easily be incorporated into the compaction by use of a liquid solution of the catalyst.

ST **FUEL CELL C ELECTRODE; CELL FUEL C**

ELECTRODE

IT Electrodes

(fuel-cell, carbon, pore size

of, compaction pressure and)

IT **Pores**

(size of, of carbon electrodes for fuel

cells, compaction pressure and)

L49 ANSWER 38 OF 38 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1963:426623 HCAPLUS

DN 59:26623

OREF 59:4779a-c

ED Entered STN: 22 Apr 2001

TI **Porous carbon** gas diffusion electrodes

AU Paxton, R.R.; Demendi, J. F.; Young, G. J.; Rozelle, R. B.

CS Pure Carbon Co., St. Marys, PA

SO Journal of the Electrochemical Society (1963), 110(8), 932-8

CODEN: JESOAN; ISSN: 0013-4651

DT Journal

LA Unavailable

CC 15 (Electrochemistry)

AB Porous C materials of widely differing properties were evaluated as gas diffusion fuel electrodes. The fuel gases were H, ethane, propane, and isobutane. Graphitized electrodes performed as well as nongraphitized electrodes. Performance of C with larger pore diameter could be improved as much as tenfold by wetproofing or by operating at high enough gas pressure to cause bubbling; however, the ultimate concentration polarization limitations appeared related only to the micropore structure. A simple method of measuring the micropore volume was developed. Limiting c.d.s. with hydrocarbons were substantially less than with H under identical cell conditions. Chemical attack, including electrochem. oxidation of some of the

C, was observed.

IT Ducts

(corrosion of, determination of)

IT Cells, voltaic

(fuel)

IT Electrodes

(fuel-cell, porous C)

IT Pores

(volume of micro-, determination in porous C fuel cell electrodes)

IT 74-98-6, Propane 75-28-5, Propane, 2-methyl-

(fuel cells from, porous C electrodes for)

IT 74-84-0, Ethane

(fuel cells using, porous C electrodes for)

IT 1333-74-0, Hydrogen

(fuel cells, C (porous) electrodes for)

=> => d que

L25 17513 SEA FILE=HCAPLUS ABB=ON (PORE# OR POROUS OR POROSITY OR ORIFICE OR APERTURE# OR HOLE OR HOLES) (6A) CARBON

L26 25758 SEA FILE=HCAPLUS ABB=ON (PORE# OR POROUS OR POROSITY OR ORIFICE OR APERTURE# OR HOLE OR HOLES) (3A) (VOLUME? OR MICRON# OR "CC/G" OR "ML/G")

L27 1595 SEA FILE=HCAPLUS ABB=ON L25 AND L26

L28 37 SEA FILE=HCAPLUS ABB=ON L27 AND FUEL (2A) CELL#

L29 115 SEA FILE=HCAPLUS ABB=ON L27 AND ELECTROCHEMICAL/SC, SX

L30 30 SEA FILE=HCAPLUS ABB=ON L29 AND (SHEET# OR COMPOSITE# OR SUBSTRATE# OR FIBER# (3A) (RESIN? OR PLASTIC? OR POLYMER?))

L31 9 SEA FILE=HCAPLUS ABB=ON L27 AND (MEA OR MEMBRANE? (3A) ELECTRODE #)

L32 8 SEA FILE=HCAPLUS ABB=ON L29 AND L31

L33 56 SEA FILE=HCAPLUS ABB=ON L28 OR L30 OR L32

L34 37 SEA FILE=HCAPLUS ABB=ON L33 AND (1840-2003)/PRY, AY, PY

L61 61013 SEA FILE=HCAPLUS ABB=ON (PORE# OR POROUS OR POROSITY OR ORIFICE OR APERTURE# OR HOLE OR HOLES) (S) (VOLUME? OR MICRON? OR "CC/G" OR "ML/G" OR "MU.M")

L63 2546 SEA FILE=HCAPLUS ABB=ON L25 AND L61

L64 113 SEA FILE=HCAPLUS ABB=ON L63 AND FUEL (3A) CELL#

L65 73 SEA FILE=HCAPLUS ABB=ON L64 AND (1840-2003)/PRY, AY, PY

L66 51 SEA FILE=HCAPLUS ABB=ON L65 NOT L34

L67 22 SEA FILE=HCAPLUS ABB=ON L66 AND (SHEET? OR COMPOSITE# OR SUBSTRATE? OR FIBER# (3A) (RESIN? OR PLASTIC? OR POLYMER?))

L69 12781 SEA FILE=HCAPLUS ABB=ON FUEL CELL ELECTRODES+PFT, NT/CT

L70 30 SEA FILE=HCAPLUS ABB=ON L66 AND L69

L71 37 SEA FILE=HCAPLUS ABB=ON L67 OR L70

=> d 171 bib abs ind 1-37

L71 ANSWER 1 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2005:546284 HCAPLUS

DN 143:81061

TI Fuel electrode for solid oxide fuel cell and its production method

IN Orui, Himeko; Arakawa, Masahiro

PA Nippon Telegraph and Telephone Corp., Japan

SO Jpn. Kokai Tokyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2005166484	A	20050623	JP 2003-404471	20031203 <--
PRAI	JP 2003-404471		20031203 <--		
AB	The invention relates to a fuel electrode for a solid oxide fuel cell, characterized in that the porosity and the average pore size are 30-45 % and 0.2-2 .mu.m, resp.				
IC	ICM H01M004-86				
	ICS H01M004-88; H01M004-90; H01M008-12				
CC	52-2 (Electrochemical, Radiational, and Thermal Energy Technology)				
ST	fuel electrode solid oxide fuel cell				
IT	Fuel cell electrodes (fuel electrode for solid oxide fuel cell)				
IT	Fuel cells (solid oxide; fuel electrode for solid oxide fuel cell)				
IT	111569-09-6, Scandium zirconium oxide 441052-36-4, Nickel scandium zirconium oxide RL: DEV (Device component use); USES (Uses) (fuel electrode for solid oxide fuel cell)				
IT	1306-38-3, Cerium oxide, uses 1314-36-9, Yttrium oxide, uses 1344-28-1, Aluminum oxide, uses RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses) (fuel electrode for solid oxide fuel cell)				
IT	7440-44-0, Carbon, uses RL: TEM (Technical or engineered material use); USES (Uses) (pore forming material; fuel electrode for solid oxide fuel cell)				

L71 ANSWER 2 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2004:1060747 HCAPLUS

DN 142:25939

TI Electrocatalyst for fuel cells using support body resistant to carbon monoxide poisoning

IN Kim, Chang-Soo; Kim, Young-Gi; Lee, Won-Yong; Park, Gu-Gon; Yang, Tae-Hyun

PA Korea Institute of Energy Research, S. Korea

SO U.S. Pat. Appl. Publ., 9 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2004248730	A1	20041209	US 2003-453136	20030603 <--
PRAI	US 2003-453136		20030603	<--	
AB	<p>Disclosed is an electrocatalyst for fuel cells, in which a porous carbon material including pores having a diameter smaller than a kinetic diameter of carbon monoxide is used as a support body and contact probability between an activated metal and carbon monoxide is decreased, thereby preventing fuel cell performance from being degraded by carbon monoxide. The electrocatalyst is obtained by adsorbing 10-80 parts by weight of an activated metal to 20-90 parts by weight of a porous support body, characterized in that the porous support body has a total surface area of 200-2500 m²/g including an outer surface thereof and an inner surface of pores thereof, and has a plurality of pores penetrating into an interior of the support body with an average diameter of 2-15 nm and a total volume of 0.4-2.0 m³/g, and the activated metal is alloyed with 20-95 at% of platinum and 5-80 at% of one metal selected from among Ru, Sn, Os, Rh, Ir, Pd, V, Cr, Co, Ni, Fe and Mn. As for such an electrocatalyst, carbon monoxide does not fundamentally come in contact with the activated metal adsorbed to the inner surface of the pores of the support body, thereby minimizing degradation of fuel cell performance, thus overcoming fuel -feeding problems.</p>				
IC	<p>ICM B01J021-18 ICS H01M004-88; B01J023-40; B01J023-00; B01J023-74</p>				
INCL	502185000; 502101000; 502180000; 502182000				
CC	52-2 (Electrochemical, Radiational, and Thermal Energy Technology) Section cross-reference(s): 56, 67				
ST	fuel cell electrocatalyst carbon monoxide poisoning resistant support				
IT	<p>Catalyst supports Fuel cell electrodes Fuel cells Poisoning, catalytic (electrocatalyst for fuel cells using support body resistant to carbon monoxide poisoning)</p>				
IT	<p>Catalysts (electrocatalysts; electrocatalyst for fuel cells using support body resistant to carbon monoxide poisoning)</p>				
IT	11107-69-0	11107-71-4	11134-15-9	12623-53-9	12779-05-4
	37186-87-1	37186-93-9	39339-47-4	50942-39-7	51402-57-4
	58049-12-0	77088-24-5			
	<p>RL: CAT (Catalyst use); USES (Uses) (electrocatalyst for fuel cells using support body resistant to carbon monoxide poisoning)</p>				
IT	<p>630-08-0, Carbon monoxide, miscellaneous RL: MSC (Miscellaneous) (electrocatalyst for fuel cells using support body resistant to carbon monoxide poisoning)</p>				
IT	<p>7440-44-0, Carbon, uses RL: CAT (Catalyst use); TEM (Technical or engineered material use); USES (Uses) (support; electrocatalyst for fuel cells using support body resistant to carbon monoxide poisoning)</p>				
L71	ANSWER 3 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN				
AN	2004:824089 HCAPLUS				
DN	141:315818				
TI	Production of porous carbon fibrous sheet as				

gas-diffusing material for fuel cell

IN Chida, Takashi; Okada, Kenya; Inoue, Mikio; Isoi, Shinya

PA Toray Industries, Inc., Japan

SO PCT Int. Appl., 63 pp.

CODEN: PIXXD2

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2004085728	A1	20041007	WO 2004-JP4158	20040325 <--
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW,				
	RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	JP 2006143478	A	20060608	JP 2003-334743	20030926 <--
	CA 2520025	A1	20041007	CA 2004-2520025	20040325 <--
	JP 2004308098	A	20041104	JP 2004-88794	20040325 <--
	EP 1612313	A1	20060104	EP 2004-723333	20040325 <--
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK				
	CN 1764752	A	20060426	CN 2004-80008038	20040325 <--
	JP 2004311431	A	20041104	JP 2004-91313	20040326 <--
	US 2006180798	A1	20060817	US 2005-550709	20050926 <--
PRAI	JP 2003-84644	A	20030326	<--	
	JP 2003-87223	A	20030327	<--	
	JP 2003-334743	A	20030926	<--	
	WO 2004-JP4158	W	20040325		

AB Title porous carbon fibrous sheet is based on carbon staple fibers dispersed randomly in a carbonized resin matrix, wherein the porosity of diameter $\leq 10 \mu$ m is 0.05-0.16 cc/g. The production process comprises (A) loading a precursor resin sheet randomly dispersed with carbon staple fibers, to a gap between two heating plates; (B) hot-pressing and discharging; and (C) carbonizing to give a porous carbon fibrous sheet. Thus, carbon fibers Torayca T-300-6K were cut to 12 mm long, dispersed in a 10 wt% water solution of poly(vinyl alc.), made into a sheet, immersed in a dispersion containing graphite BF-5A, phenolic resins, and methanol (1:4:16), hot-pressed, and carbonized at 2000° to give a test piece showing flexural modulus 12 GPa, maximum bending load 0.59 N/cm, resistivity 10 mΩ·cm², and fuel cell voltage 0.49 V.

IC ICM D04H001-42

ICS C04B035-83; H01M004-96

CC 40-10 (Textiles and Fibers)

Section cross-reference(s): 52

ST carbon fiber phenolic resin gas diffusing membrane
fuel cell

IT Carbon fibers, uses

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(Torayca T 300-6K; production of porous carbon fibrous

sheet as gas-diffusing material for fuel cell
)

IT Membranes, nonbiological
(diffusion; production of porous carbon fibrous
sheet as gas-diffusing material for fuel cell
)

IT Phenolic resins, uses
RL: CPS (Chemical process); PEP (Physical, engineering or chemical
process); PYP (Physical process); TEM (Technical or engineered material
use); PROC (Process); USES (Uses)
(precursor matrix; production of porous carbon fibrous
sheet as gas-diffusing material for fuel cell
)

IT Fuel cell electrodes
Porous materials
(production of porous carbon fibrous sheet as
gas-diffusing material for fuel cell)

IT Carbon black, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(production of porous carbon fibrous sheet as
gas-diffusing material for fuel cell)

IT 9002-89-5, PVA
RL: TEM (Technical or engineered material use); USES (Uses)
(binder; production of porous carbon fibrous
sheet as gas-diffusing material for fuel cell
)

IT 7782-42-5, BF 5A, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(production of porous carbon fibrous sheet as
gas-diffusing material for fuel cell)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L71 ANSWER 4 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2004:677893 HCAPLUS

DN 141:210055

TI Porous electrode support made from carbon short
fibers for solid polymer-type fuel
cell and manufacture thereof

IN Nakamura, Makoto; Hayashi, Shoji; Sumioka, Kazuhiro

PA Mitsubishi Rayon Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 16 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2004235134	A	20040819	JP 2003-133579	20030512 <--
PRAI	JP 2002-350066	A	20021202	<--	
AB	Disclosed is the porous electrode support comprising (a) a 1st porous electrode support which is made from carbon short fibers with the diameter 0.1-5 .mu.m and the length 0.2-9 mm randomly dispersed and bonded by carbon and (b) a 2nd porous electrode support which is made from carbon short fibers with the diameter 6-20 .mu.m and the length 3-20 mm randomly dispersed and bonded by carbon, both of which are laminated and integrated by carbon. The support has good contact with the catalyst layer, and shows excellent mech. strength.				
IC	ICM H01M004-96				

ICS H01M004-86; H01M004-88; H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST porous electrode support carbon short fiber
 fuel cell; polymer electrolyte fuel
 cell
 IT Fuel cell electrodes
 Fuel cells
 (porous electrode support made from carbon short
 fibers for solid polymer-type fuel
 cell)
 IT Carbon fibers, uses
 RL: DEV (Device component use); EPR (Engineering process); PEP (Physical,
 engineering or chemical process); PROC (Process); USES (Uses)
 (porous electrode support made from carbon short
 fibers for solid polymer-type fuel
 cell)
 IT 7440-44-0, Carbon, uses 9002-89-5, VBP105-1 9003-35-4,
 Phenolite J325 25014-41-9, Polyacrylonitrile
 RL: EPR (Engineering process); NUU (Other use, unclassified); PEP
 (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (porous electrode support made from carbon short
 fibers for solid polymer-type fuel
 cell)

L71 ANSWER 5 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 2003:783069 HCAPLUS
 DN 139:280116
 TI Porous carbon plate and its manufacture for electrodes
 IN Yoshida, Sachiyo; Shishigakura, Shuichi; Inoue, Mikio
 PA Toray Industries, Inc., Japan
 SO Jpn. Kokai Tokkyo Koho, 6 pp.
 CODEN: JKXXAF

DT Patent
 LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003286085	A	20031007	JP 2002-88350	20020327 <--
PRAI	JP 2002-88350		20020327	<--	

AB The porous C plate is 2-dimensionally and randomly dispersed C
 short fibers bonded with C, and has center line average roughness Ra (JIS B
 0601) $\leq 15 \mu\text{m}$ on at least one of the plate
 surfaces and lengthwise load rate (tp) $\geq 50\%$ under cutting level 20
 μm . The porous C plate is manufactured by the
 following steps: (1) laminating ≥ 2 layers of a mixture of C short
 fibers and polymers via parting plates having surface
 center line average roughness Ra (JIS B 0601) $\leq 1.0 \mu\text{m}$
 m, (2) compression-molding the laminate, and (3) carbonizing the
 compressed laminate. The porous C plate has high gas permeability, low
 elec. resistance, and large effective surface contact area. The porous C
 plate is useful as electrode substrates for polymer electrolyte
 fuel cells, electrodes for electrolysis, and so on.
 IC ICM C04B035-83
 ICS C01B031-02; H01M004-88; H01M004-96; H01M008-10
 CC 57-8 (Ceramics)
 Section cross-reference(s): 52, 72
 ST porous carbon plate manuf fiber dispersion
 carbonization electrode; gas permeability low elec resistance
 porous carbon plate
 IT Carbon fibers, processes

RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(Torayca T 300; manufacture of porous C plate comprising C short fibers bonded with C for electrodes)

IT Carbonization

Electrodes

(manufacture of porous C plate comprising C short fibers bonded with C for electrodes)

IT Phenolic resins, processes

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)

(novolak, carbonization of; manufacture of porous C plate comprising C short fibers bonded with C for electrodes)

IT Phenolic resins, processes

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)

(resol, carbonization of; manufacture of porous C plate comprising C short fibers bonded with C for electrodes)

IT 9002-89-5, Polyvinyl alcohol

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)

(carbonization of; manufacture of porous C plate comprising C short fibers bonded with C for electrodes)

IT 7440-44-0P, Carbon, preparation

RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)

(manufacture of porous C plate comprising C short fibers bonded with C for electrodes)

L71 ANSWER 6 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2003:755032 HCAPLUS

DN 139:279054

TI Manufacture of porous diffusion electrode for solid polymer electrolyte fuel cell

IN Harada, Keizo; Mizuno, Osamu

PA Sumitomo Electric Industries, Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003272638	A	20030926	JP 2002-76140	20020319 <--
	JP 3922056	B2	20070530		
PRAI	JP 2002-76140		20020319 <--		

AB The porous diffusion electrode is comprised of a porous metal substrate of a networked pore structure with an average pore size of 50 .mu.m-1 mm, and a laminated porous organic film with good water repellency. Multiple protrusions on the metal substrate piece through the organic film for increased conductivity The metal porous material is made of Fe-Cr or Ni-Cr alloy with addition of C, Ni, Mo, Cu, B, Al, Si, and/or Ti.

IC ICM H01M004-86

ICS B32B005-32; B32B015-08; C22C019-05; C22C038-00; C22C038-22; C25B011-03; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST porous diffusion electrode fuel cell cond lamination

water repellency
 IT Lamination
 (for manufacture of porous diffusion electrode for solid polymer electrolyte
 fuel cell)
 IT **Electrodes**
 (gas-diffusion; manufacture of porous diffusion electrode for solid polymer
 electrolyte fuel cell)
 IT **Electrodes**
 Fuel cells
 Porous materials
 (manufacture of porous diffusion electrode for solid polymer electrolyte
 fuel cell)
 IT Electric conductivity
 (of porous diffusion electrode for solid polymer electrolyte
 fuel cell)
 IT Fluoropolymers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (organic porous film; manufacture of porous diffusion electrode for solid
 polymer electrolyte fuel cell)
 IT Ionomers
 RL: NUU (Other use, unclassified); USES (Uses)
 (polyoxyalkylenes, fluorine- and sulfo-containing, electrolyte; manufacture
 of porous diffusion electrode for solid polymer electrolyte fuel
 cell)
 IT 7440-06-4, Platinum, uses
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst; manufacture of porous diffusion electrode for solid polymer
 electrolyte fuel cell)
 IT 7440-44-0, Carbon, uses
 RL: CAT (Catalyst use); USES (Uses)
 (catalytic support; manufacture of porous diffusion electrode for
 solid polymer electrolyte fuel cell)
 IT 11149-25-0 606093-29-2, Chromium 25, iron 69, molybdenum 6
 606093-30-5, Chromium 30, iron 60, molybdenum 6, nickel 4 606093-31-6,
 Chromium 28, copper 0.5, iron 68, molybdenum 4 606093-32-7, Boron 1.5,
 chromium 28, iron 65, molybdenum 6
 RL: NUU (Other use, unclassified); USES (Uses)
 (electrode substrate; manufacture of porous diffusion electrode
 for solid polymer electrolyte fuel cell)
 IT 9002-84-0, PTFE
 RL: TEM (Technical or engineered material use); USES (Uses)
 (organic porous film; manufacture of porous diffusion electrode for solid
 polymer electrolyte fuel cell)

L71 ANSWER 7 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 2003:677217 HCAPLUS
 DN 140:44608
 TI Effect of anode porosity and pore size on electrochemical performance
 AU Deng, Xiaohua; Petric, Anthony
 CS Department of Materials Science and Engineering, McMaster University,
 Hamilton, ON, L8S 4L7, Can.
 SO Proceedings - Electrochemical Society (2003), 2003-7(Solid Oxide
 Fuel Cells VIII (SOFC VIII)), 653-661
 CODEN: PESODO; ISSN: 0161-6374
 PB Electrochemical Society
 DT Journal
 LA English
 AB Solid oxide fuel cells consisting of LSCF, YSZ and
 Ni-YSZ were fabricated with anodes of controlled porosity and pore size.

The effects of porosity and pore size on cell performance were studied theor. and exptl. A geometric simulation was used to determine the 3-phase-boundary length (TPBL) which is one of main factors determining the anodic reaction and, consequently, cell performance. The TPBL calcn. indicated there exists an optimum porosity and pore size in the anode, depending on grain size. A porosity of 35-40% is optimum for cell performance of the fuel cells studied. Based on the anodes tested, having pore sizes from 1 to 10 μ m, cell performance improved with increasing pore size.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST nickel YSZ anode porosity pore size simulation fuel cell

IT Fuel cell anodes

Pore size

Porosity

(effect of anode porosity and pore size on electrochem. performance of fuel cells)

IT Carbon black, uses

Carbon fibers, uses

RL: NUU (Other use, unclassified); USES (Uses)

(pore former; in effect of anode porosity and pore size on electrochem. performance of fuel cells)

IT Fuel cells

(solid oxide; effect of anode porosity and pore size on electrochem. performance of fuel cells)

IT 7440-02-0, Nickel, uses 114168-16-0, Yttrium zirconium oxide (Y0.16Zr0.92O2.08)

RL: DEV (Device component use); USES (Uses)

(anode containing; effect of anode porosity and pore size on electrochem. performance of fuel cells with)

IT 7782-42-5, Graphite, uses

RL: NUU (Other use, unclassified); USES (Uses)

(flakes, pore former; in effect of anode porosity and pore size on electrochem. performance of fuel cells)

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L71 ANSWER 8 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2003:279739 HCAPLUS

DN 138:306769

TI Electrode material for fuel cell and its manufacture

IN Yoshikawa, Hirohi

PA Noritake Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 13 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003109608	A	20030411	JP 2001-303706	20010928 <--
	JP 3686364	B2	20050824		
PRAI	JP 2001-303706		20010928 <--		

AB The electrode material has a porous C layer on the surface of a conductive porous support, where the C layer has average pore diameter 0.05-0.2 μ m and porosity 25-50%. The electrode is prepared by applying a mixture of C particles and a resin on a conductive porous support, and firing the mixture to carbonized the resin.

IC ICM H01M004-88

ICS H01M004-86; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST **fuel cell carbon electrode structure manuf**
 IT Phenolic resins, processes
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
 (resol; structure and manufacture of electrodes containing **porous carbon-carbonized resin layer on porous carbon supports for fuel cells**)
 IT **Fuel cell electrodes**
 (structure and manufacture of electrodes containing **porous carbon-carbonized resin layer on porous carbon supports for fuel cells**)
 IT Carbon black, uses
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (structure and manufacture of electrodes containing **porous carbon-carbonized resin layer on porous carbon supports for fuel cells**)
 IT 7440-44-0, Carbon, uses
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (structure and manufacture of electrodes containing **porous carbon-carbonized resin layer on porous carbon supports for fuel cells**)

L71 ANSWER 9 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2002:716909 HCAPLUS

DN 137:250296

TI Electrode base material for making a gas diffusion electrode for **fuel cell**

IN Ohya, Shyusei; Takagi, Jun; Fujii, Yuuichi; Yao, Shigeru

PA Ube Industries, Ltd., Japan

SO U.S. Pat. Appl. Publ., 12 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002132159	A1	20020919	US 2002-98426	20020318 <--
	JP 2002170574	A	20020614	JP 2001-78497	20010319 <--
	JP 2003128409	A	20030508	JP 2001-322932	20011022 <--
	JP 2003132900	A	20030509	JP 2001-322927	20011022 <--
	US 2007082805	A1	20070412	US 2006-636440	20061211 <--
	JP 2007123284	A	20070517	JP 2006-340720	20061219 <--
PRAI	JP 2001-78497	A	20010319	<--	
	JP 2001-322927	A	20011022	<--	
	JP 2001-322932	A	20011022	<--	
	JP 2000-287361	A	20000921	<--	
	US 2002-98426	A3	20020318	<--	
AB	Disclosed are a carbon porous membranous structure having fine interconnecting pores an average diameter of which is 0.05 to 10 μm and a porosity of 15 to 85% and a metal-dispersed carbon structure comprising that carbon porous membranous structure having dispersed therein fine particles of at least one kind of a metal and an alloy. The carbon porous membranous structures are useful as a component of fuel cells , particularly as an electrode base material of gas diffusion electrodes for solid polymer electrolyte fuel cells and phosphoric acid fuel				

cells.

IC ICM H01M004-96
 INCL 429044000
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38
 ST **fuel cell electrode base carbon**
porous membranous structure
 IT **Fuel cells**
 (H3PO4; electrode base material for making gas diffusion electrode for **fuel cell**)
 IT Polyimides, uses
 RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (carbonization product; electrode base material for making gas diffusion electrode for **fuel cell**)
 IT Graphitization
 Membranes, nonbiological
 (electrode base material for making gas diffusion electrode for **fuel cell**)
 IT Polyamic acids
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
 (electrode base material for making gas diffusion electrode for **fuel cell**)
 IT **Fuel cell electrodes**
 (gas diffusion; electrode base material for making gas diffusion electrode for **fuel cell**)
 IT Polymers, uses
 RL: DEV (Device component use); USES (Uses)
 (heat-resistant, carbonization product; electrode base material for making gas diffusion electrode for **fuel cell**)
 IT **Fuel cells**
 (solid electrolyte; electrode base material for making gas diffusion electrode for **fuel cell**)
 IT 7440-06-4, Platinum, uses
 RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)
 (electrode base material for making gas diffusion electrode for **fuel cell**)
 IT 29319-22-ODP, 3,3',4,4'-Biphenyltetracarboxylic acid dianhydride-p-phenylenediamine copolymer, carbonization product 32197-39-ODP, carbonization product 71329-95-8DP, carbonization product
 RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); USES (Uses)
 (electrode base material for making gas diffusion electrode for **fuel cell**)
 IT 7440-44-0, Carbon, uses 66796-30-3, Nafion 117 460088-25-9, Nafion 5012
 RL: DEV (Device component use); USES (Uses)
 (electrode base material for making gas diffusion electrode for **fuel cell**)

L71 ANSWER 10 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 2002:447295 HCAPLUS
 DN 137:35477
 TI **Fuel cell electrode substrate**
 IN Oya, Nobuo; Yao, Shigeru
 PA Ube Industries, Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 8 pp.
 CODEN: JKXXAF

DT Patent
 LA Japanese
 FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002170574	A	20020614	JP 2001-78497	20010319 <--
	EP 1244165	A2	20020925	EP 2002-5354	20020314 <--
	EP 1244165	A3	20060329		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
	US 2002132159	A1	20020919	US 2002-98426	20020318 <--
	AU 200226168	A	20020926	AU 2002-26168	20020318 <--
	AU 784328	B2	20060309		
	CN 1375886	A	20021023	CN 2002-107457	20020319 <--
	US 2007082805	A1	20070412	US 2006-636440	20061211 <--
PRAI	JP 2000-287361	A	20000921	<--	
	JP 2001-78497	A	20010319	<--	
	JP 2001-322927	A	20011022	<--	
	JP 2001-322932	A	20011022	<--	
	US 2002-98426	A3	20020318	<--	
AB	The substrate is a fine porous C sheet having average pore diameter 0.05-10 .mu.m and 15-85% porosity. The substrate is preferably a carbonized heat resistant polymer, has ≥50% graphitization, and may also contain metal nanoparticles.				
IC	ICM H01M004-96 ICS H01M004-96; B01J021-18; B01J023-42; B01J032-00; C01B031-04; C04B035-52; H01M004-88; H01M008-10				
CC	52-2 (Electrochemical, Radiational, and Thermal Energy Technology)				
ST	fuel cell electrode porous carbon sheet metal nanoparticle				
IT	Fuel cell electrodes (graphitized carbonaceous sheets with controlled average pore diameter and porosity and containing metal nanoparticles for fuel cell electrode substrates)				
IT	Carbonaceous materials (technological products) RL: DEV (Device component use); PRP (Properties); USES (Uses) (graphitized carbonaceous sheets with controlled average pore diameter and porosity and containing metal nanoparticles for fuel cell electrode substrates)				
IT	26298-81-7D, pyrolyzed, graphitized 26615-45-2D, pyrolyzed, graphitized 29319-22-0D, pyrolyzed, graphitized 32197-39-0D, pyrolyzed, graphitized RL: DEV (Device component use); PRP (Properties); USES (Uses) (carbonized heat resistant polymer sheets with controlled average pore diameter and porosity for fuel cell electrode substrates)				
IT	7440-06-4, Platinum, uses RL: CAT (Catalyst use); USES (Uses) (graphitized carbonaceous sheets containing platinum nanoparticles for fuel cell electrode substrates)				
L71	ANSWER 11 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN				
AN	2001:881947 HCAPLUS				
DN	136:21944				
TI	Fuel cell electrode and the fuel cell				
IN	Isono, Takahiro; Kabumoto, Hiroki; Konno, Yoshito; Yonetsu, Ikuo				
PA	Sanyo Electric Co., Ltd., Japan				
SO	Jpn. Kokai Tokkyo Koho, 10 pp.				

CODEN: JKXXAF

DT Patent
 LA Japanese
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001338651	A	20011207	JP 2000-160056	20000530 <--
	JP 3459615	B2	20031020		
PRAI	JP 2000-160056		20000530	<--	

AB The electrode is a laminate of a catalyst layer and a gas diffusion layer, and has a pore size distribution peak $\leq 0.1 \mu$ m in both layers.

IC ICM H01M004-86
 ICS H01M008-02; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST fuel cell electrode pore size distribution

IT Fuel cell electrodes

Pore size distribution

(controlled pore size distribution in carbon black gas diffusion layer and catalyst layer for fuel cell electrodes)

IT Carbon black, uses

RL: DEV (Device component use); PRP (Properties); USES (Uses)

(controlled pore size distribution in carbon black gas diffusion layer and catalyst layer for fuel cell electrodes)

L71 ANSWER 12 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2001:579461 HCAPLUS

DN 135:168830

TI Electrode, membrane-electrode assembly using it, their manufacture, electrochemical apparatus using the assembly, and vehicle using the apparatus

IN Kitai, Masayuki; Kojima, Sadao; Morikawa, Hirofumi

PA Toray Industries, Inc., Japan

SO Jpn. Kokai Tokkyo Koho, 18 pp.

CODEN: JKXXAF

DT Patent
 LA Japanese
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001216972	A	20010810	JP 2000-24113	20000201 <--
PRAI	JP 2000-24113		20000201	<--	

AB The electrode comprises a substrate (preferably, porous conductive sheet) and a catalyst layer, where part of the catalyst permeates into the substrate to form a mixture layer with thickness $\leq 20 \mu\text{m}$. The electrode is manufactured by applying a catalyst solution on a substrate. The title assembly is manufactured by (A) placing the catalyst-layer side of the electrode on both surfaces of a proton-exchange membrane and bonding the laminate or by (B) forming the catalyst layer on both surfaces of the membrane and then placing the substrates. Also claimed are electrochem. apparatus such as water-electrolysis apparatus and fuel cell using the assembly, and vehicles such as automobile using the fuel cell. Since thickness of the mixture layer is thin, utilization efficiency of the catalyst becomes high.

IC ICM H01M004-86

ICS C25B009-00; C25B011-12; C25B009-10; H01M004-88; H01M008-02; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST catalyst layer proton exchange membrane electrode assembly electrochem
 app; **fuel cell** membrane electrode assembly; water
 electrolysis app membrane electrode assembly; automobile membrane
 electrode assembly **fuel cell**
 IT Carbon black, uses
 RL: CAT (Catalyst use); USES (Uses)
 (Vulcan XC 72, catalyst support; membrane-electrode assembly having
 catalyst layer with low permeation into porous **substrate** for
 electrochem. apparatus and vehicle using it)
 IT Polyoxyalkylenes, uses
 RL: DEV (Device component use); USES (Uses)
 (fluorine- and sulfo-containing, ionomers, Nafion, catalyst layer
 containing;
 membrane-electrode assembly having catalyst layer with low permeation
 into porous **substrate** for electrochem. apparatus and vehicle using
 it)
 IT Fluoropolymers, uses
 RL: DEV (Device component use); USES (Uses)
 (fluoroalkoxy group-containing, porous **substrate** impregnated
 with; membrane-electrode assembly having catalyst layer with low
 permeation into porous **substrate** for electrochem. apparatus and
 vehicle using it)
 IT Automobiles
 Electrodes
 Electrolytic cells
Fuel cell electrodes
 Ion exchange membranes
 (membrane-electrode assembly having catalyst layer with low permeation
 into porous **substrate** for electrochem. apparatus and vehicle using
 it)
 IT Fluoropolymers, uses
 RL: DEV (Device component use); USES (Uses)
 (polyoxyalkylene-, sulfo-containing, ionomers, Nafion, catalyst layer
 containing; membrane-electrode assembly having catalyst layer with low
 permeation into porous **substrate** for electrochem. apparatus and
 vehicle using it)
 IT Ionomers
 RL: DEV (Device component use); USES (Uses)
 (polyoxyalkylenes, fluorine- and sulfo-containing, Nafion, catalyst layer
 containing; membrane-electrode assembly having catalyst layer with low
 permeation into porous **substrate** for electrochem. apparatus and
 vehicle using it)
 IT Fluoropolymers, uses
 RL: DEV (Device component use); USES (Uses)
 (porous **substrate** impregnated with; membrane-electrode
 assembly having catalyst layer with low permeation into porous
substrate for electrochem. apparatus and vehicle using it)
 IT Carbon fibers, uses
 RL: DEV (Device component use); USES (Uses)
 (porous **substrate**, fluoropolymer-impregnated;
 membrane-electrode assembly having catalyst layer with low permeation
 into porous **substrate** for electrochem. apparatus and vehicle using
 it)
 IT 7439-88-5, Iridium, uses 7440-05-3, Palladium, uses 7440-06-4,
 Platinum, uses 7440-18-8, Ruthenium, uses 7440-57-5, Gold, uses
 RL: CAT (Catalyst use); USES (Uses)
 (membrane-electrode assembly having catalyst layer with low permeation
 into porous **substrate** for electrochem. apparatus and vehicle using
 it)

IT 116-14-3D, Tetrafluoroethylene, polymers with perfluoroalkyl vinyl ether
 9002-84-0, Polyflon TFE D-1 143067-14-5, Neoflon PFA AD 2CR
 RL: DEV (Device component use); USES (Uses)
 (porous **substrate** impregnated with; membrane-electrode
 assembly having catalyst layer with low permeation into porous
substrate for electrochem. apparatus and vehicle using it)

IT 7440-44-0, ELAT, uses 7782-42-5, Graphite, uses 354114-33-3, TGP-H 060
 RL: DEV (Device component use); USES (Uses)
 (porous **substrate**, fluoropolymer-impregnated;
 membrane-electrode assembly having catalyst layer with low permeation
 into porous **substrate** for electrochem. apparatus and vehicle using
 it)

IT 163294-14-2, Nafion 112
 RL: DEV (Device component use); USES (Uses)
 (proton-exchange membrane; membrane-electrode assembly having catalyst
 layer with low permeation into porous **substrate** for
 electrochem. apparatus and vehicle using it)

L71 ANSWER 13 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2001:453464 HCAPLUS

DN 135:35225

TI Fine pore enthalpy exchange barrier for a **fuel cell**
 power plant

IN Grasso, Albert P.; Saito, Kazuo

PA UTC Fuel Cells, LLC, USA

SO U.S. Pat. Appl. Publ., 13 pp., Cont.-in-part of U.S. Ser. No. 395,704.
 CODEN: USXXCO

DT Patent

LA English

FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
PI	US 2001004500	A1	20010621	US 2000-740590	20001219 <--	
	US 6475652	B2	20021105			
	WO 2002093674	A1	20021121	WO 2001-US51640	20011213 <--	
	W:			AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW		
	RW:			GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG		
	AU 2001297798	A1	20021125	AU 2001-297798	20011213 <--	
	EP 1352438	A1	20031015	EP 2001-273895	20011213 <--	
	R:			AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR		
PRAI	US 1999-395704	A2	19990914		<--	
	US 2000-740590	A	20001219		<--	
	WO 2001-US51640	W	20011213		<--	

AB A fine pore enthalpy exchange barrier is disclosed for use with a **fuel cell** power plant. The barrier includes a flexible support matrix that defines pores and a liquid transfer medium that fills the pores creating a gas barrier. An inlet surface of the fine pore enthalpy exchange barrier is positioned in contact with a process oxidant inlet stream entering a **fuel cell** power plant, and an opposed exhaust surface of the barrier is positioned in contact with an exhaust stream exiting the plant so that water and heat exchange from the exhaust stream directly into the process oxidant inlet stream to heat and

humidify the stream as it enters the plant. The flexible support matrix defines hydrophilic pores having a pore-size range of about 0.1-100 μm and results in a bubble pressure that is greater than 0.2 psi. The liquid transfer medium may include water, aqueous salt solns., aqueous acid solns., or organic antifreeze water solns.

The

fine pore enthalpy exchange barrier may be disposed within a structure of a direct mass and heat transfer device of the plant in fluid communication with the process oxidant inlet and plant exhaust streams so that the structure and barrier cooperate to restrict bulk mixing of the inlet and exhaust streams, and water and heat transfer through the transfer medium from the plant exhaust stream into the process oxidant stream entering the plant.

IC ICM H01M008-04

ICS H01M008-06

INCL 429013000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 48

ST fuel cell power plant enthalpy exchange barrier

IT Polymers, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(binder; fine pore enthalpy exchange barrier for fuel cell power plant)

IT Antifreeze

Fuel cells

Heat exchangers

Heat transfer

Heat transfer agents

Mass transfer

(fine pore enthalpy exchange barrier for fuel cell power plant)

IT Carbon black, uses

Glass fibers, uses

Synthetic polymeric fibers, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(fine pore enthalpy exchange barrier for fuel cell power plant)

IT Synthetic fibers

RL: TEM (Technical or engineered material use); USES (Uses)

(inorg., synthetic fibers; fine pore enthalpy exchange barrier for fuel cell power plant)

IT Fuel cells

(power plants; fine pore enthalpy exchange barrier for fuel cell power plant)

IT 56-81-5, Glycerol, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(fine pore enthalpy exchange barrier for fuel cell power plant)

L71 ANSWER 14 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2001:409889 HCAPLUS

DN 135:213333

TI Integration of carbon aerogels in polymer electrolyte membrane fuel cells

AU Glora, M.; Wiener, M.; Petricevic, R.; Probstle, H.; Fricke, J.

CS Physikalisches Institut, University of Wurzburg and Bavarian Center for Applied Energy Research (ZAE Bayern), Wurzburg, 97074, Germany

SO Journal of Non-Crystalline Solids (2001), 285(1-3), 283-287

CODEN: JNCSBJ; ISSN: 0022-3093

PB Elsevier Science B.V.

DT Journal

LA English

AB We prepared resorcinol-formaldehyde (RF) aerogel films with a high molar ratio of resorcinol/catalyst (R/C) of about 1500 and a low mass ratio of 30%. At the onset of the gelation process, organic fibers or carbon fiber fleece were added to the sol in order to increase the mech. stability. Upon pyrolysis the RF-aerogel as well as the organic fibers were transformed into porous nanostructured carbon. The thickness of the films was about 500 μm and below. As previously shown, the addition of fibers modifies the gelation and thus the structure of the carbon network as well as the particle and pore sizes in characteristic ways. To investigate this influence, samples with different fiber types and contents were prepared SEM was used to determine the particle and pore sizes. The largest pore sizes obtained were in the range of several microns. The highest elec. conductivity reached was about 28 S/cm for a sample with almost 80% porosity. Tests of single cells prepared with carbon aerogel sheets show that films with a rather coarse structure in the interior and a micron thin fine structured top and bottom layer are most suitable as gas diffusion electrodes in polymer electrolyte membrane fuel cells. The top and bottom layer promote the formation of low resistance elec. contacts between the gas diffusion electrodes and the polymeric membrane as well as the current collector.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST polymer electrolyte membrane fuel cell carbon aerogels

IT Aerogels

Electrodes

Fuel cells

Polymer electrolytes

(integration of carbon aerogels in polymer electrolyte membrane

fuel cells)

IT 7440-44-0, Carbon, processes

RL: PEP (Physical, engineering or chemical process); PRP (Properties);

PROC (Process)

(integration of carbon aerogels in polymer electrolyte membrane

fuel cells)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L71 ANSWER 15 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2001:229197 HCAPLUS

DN 134:254655

TI Electrode-ion exchanger electrolyte membrane laminates for polymer electrolyte fuel cells and their manufacture

IN Kunisa, Yasuhiro; Yoshitake, Masaru; Endoh, Eiji; Yanagisawa, Eiji

PA Asahi Glass Company, Limited, Japan

SO PCT Int. Appl., 24 pp.

CODEN: PIXXD2

DT Patent

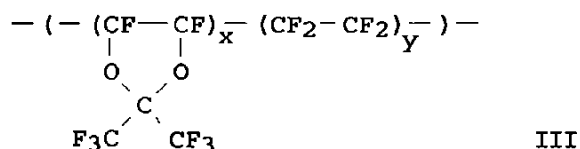
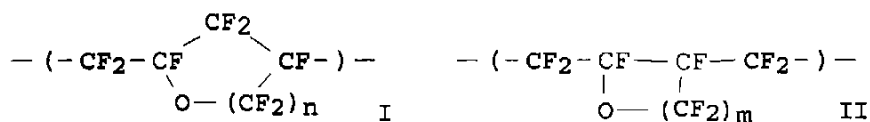
LA Japanese

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001022510	A1	20010329	WO 2000-JP6384	20000919 <--
	W: JP, US				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	EP 1223628	A1	20020717	EP 2000-961084	20000919 <--
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY				
PRAI	JP 1999-266067	A	19990920		<--

WO 2000-JP6384 W 20000919 <--

GI



AB The laminates have an ion exchanger electrolyte membrane between a cathode and an anode; where the cathode and/or anode has a porous C substrate, a fluoro resin-carbon black gas diffusion layer on the substrate, a catalyst layer containing a sulfonated fluorocarbon polymer on the gas diffusion layer, and a soluble non-ion exchanger fluoropolymer with the catalyst layer contacting the electrolyte membrane; and the electrolyte membrane is a 20-150 .mu.m thick sulfonated fluorocarbon polymer. The soluble fluoropolymer is I, II, or III. The laminates are prepared by applying a fluoropolymer-carbon black mixture on a porous C substrates, with part of the mixture filled in the pores of the substrate, to form a gas diffusion layer, applying a catalyst layer on gas diffusion layer, impregnating the assemblies with a solution of a soluble fluoropolymer, firing at 100-200° to obtain gas diffusion electrodes, holding an ion exchanger electrolyte membrane between 2 gas diffusion electrodes, with the catalyst layers facing each other, and hot pressing.

IC ICM H01M004-96

ICS H01M004-88; H01M008-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST polymer electrolyte fuel cell ion exchanger electrode

laminate manuf; sol fluoropolymer fuel cell electrode

electrolyte laminate

IT Fluoropolymers, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(gas diffusion electrode-ion exchanger electrolyte membrane laminates containing non-ion exchanger fluoropolymers for fuel cells)

IT Fuel cells

(structure and manufacture of gas diffusion electrode-ion exchanger electrolyte membrane laminates for fuel cells)

IT Carbon black, uses

Carbon fibers, uses

Fluoropolymers, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(structure and manufacture of gas diffusion electrode-ion exchanger electrolyte membrane laminates for fuel cells)

IT 69818-05-9

RL: DEV (Device component use); PEP (Physical, engineering or chemical

process); PROC (Process); USES (Uses)
 (gas diffusion electrode-ion exchanger electrolyte membrane laminates
 containing non-ion exchanger fluoropolymers for **fuel**
cells)

IT 9002-84-0, Polytetrafluoroethylene 331412-09-0
 RL: DEV (Device component use); PEP (Physical, engineering or chemical
 process); PROC (Process); USES (Uses)
 (structure and manufacture of gas diffusion electrode-ion exchanger
 electrolyte membrane laminates for **fuel cells**)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L71 ANSWER 16 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2000:871233 HCAPLUS

DN 134:44460

TI Fabrication and characteristics of anode-supported tube for solid oxide
fuel cell

AU Kim, Eung Yong; Song, Rak-Hyun; Lim, Yeung-Eon

CS Dep. Materials Eng., Chungnam National Univ., Taejon, S. Korea

SO Han'guk Chaelyo Hakhoechi (2000), 10(10), 659-664

CODEN: HCHAEU; ISSN: 1225-0562

PB Materials Research Society of Korea

DT Journal

LA Korean

AB To develop anode-supported tubular cell with proper porosity, we have
 investigated the anode **substrate** and the electrolyte-coated
 anode tube. The anode **substrate** was manufactured as a function of
 carbon content in the range of 20-50 volume%. As the **carbon**
 content increased, the **porosity** of the anode **substrate**
 increased slightly and the **carbon** content with proper
porosity is found to be 30 volume%. The anode-supported
 tube was fabricated by extrusion process and the electrolyte layer was
 coated on the anode tube by slurry coating process. The anode-supported
 tube was co-fired successfully at 1400° in air. The porosity of
 the anode tube was 35%. From the gas permeation test, the anode tube was
 found to be porous enough for gas supply. On the other hand, the
 anode-supported tube with electrolyte layer indicated a very low gas
 permeation rate. This means that the coated electrolyte was dense.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST anode supported tube solid oxide **fuel cell**

IT **Fuel cell anodes**

(fabrication and characteristics of anode-supported tube for solid
 oxide **fuel cells**)

IT 7440-44-0, Carbon, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical
 process); PROC (Process); USES (Uses)

(anode **substrate**; fabrication and characteristics of
 anode-supported tube for solid oxide **fuel cells**)

IT 143107-06-6

RL: DEV (Device component use); USES (Uses)

(anode; fabrication and characteristics of anode-supported tube for
 solid oxide **fuel cells**)

L71 ANSWER 17 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2000:421539 HCAPLUS

DN 133:20091

TI Anode **substrates** for medium temperature solid state **fuel**
cells and their manufacture

IN Cao, Huaqiang; Jiang, Yi; Lu, Zigui; Yan, Jingwang

PA Dalian Chemical Physics Institute, Chinese Academy of Sciences, Peop. Rep.

China
 SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 5 pp.
 CODEN: CNXXEV

DT Patent
 LA Chinese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1226090	A	19990818	CN 1998-113759	19980212 <--
	CN 1118879	B	20030820		
PRAI	CN 1998-113759		19980212 <--		

AB The anode **substrates** are 0.5-5 mm thick porous NiO-YSZ ceramics containing 30-80% NiO and having average pore diameter 30-60Å and porosity 30-50%. The **substrates** are prepared by mixing 120-360 mesh NiO powder with 100 nm-100 .mu.m YSZ powder and 2-20% pore forming agent, press molding the mixture sintering at 300-1350° under atmospheric pressure, and reducing at 800-950° in a N-(5-50)% H atmospheric for 1-3 h.

IC ICM H01M004-86
 ICS H01M004-88

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST fuel cell nickel oxide YSZ anode manuf

IT Fuel cell anodes

(pore forming agent in manufacture of anode for medium temperature solid state

fuel cells)

IT Carbon black, uses

RL: NUU (Other use, unclassified); USES (Uses)

(pore forming agent in manufacture of anode for medium temperature solid state **fuel cells)**

IT 7440-44-0, Carbon, uses

RL: NUU (Other use, unclassified); USES (Uses)

(activated; pore forming agent in manufacture of anode for medium temperature solid state **fuel cells)**

IT 149319-21-1, Nickel yttrium zirconium oxide

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(compns. and structure and manufacture of anode for medium temperature solid state

fuel cells)

IT 9004-67-5, Methyl cellulose 9005-25-8, Starch, uses

RL: NUU (Other use, unclassified); USES (Uses)

(pore forming agent in manufacture of anode for medium temperature solid state

fuel cells)

L71 ANSWER 18 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2000:408765 HCAPLUS

DN 133:32737

TI Electrically conductive porous carbon sheets
 , their manufacture, and solid polymer fuel cells
 comprising the sheets

IN Nanba, Yoichi; Mashiko, Tsutomu

PA Showa Denko K. K., Japan

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI JP 2000169253 A 20000620 JP 1998-351179 19981210 <--
 PRAI JP 1998-351179 19981210 <--
 AB The **sheets** comprises carbon powder (average particle size 5-30 .
mu.m) 65-90, binder 5-20, and pulp 5-20 weight% and have
 thickness 0.05-2 mm, bulk d. 0.8-1.3 g/cm³, **pore** diameter 1-20 .
mu.m, volume sp. resistivity <0.2 Ω -cm,
 and gas permeability 0.001-10 cm³/cm²/min/mmAq. The **sheets** are
 manufactured from a mixture having the above stated composition, by
 paper-making
 process followed by firing at 150-400° under application of
 ≤ 5 kg/cm² pressure. Solid polymer **fuel cells**
 using the **sheets** as moisture controllers are also claimed.
 IC ICM C04B038-00
 ICS H01M008-02; H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 57, 76
 ST moisture controlling carbon **sheet fuel cell**;
 carbon elec conducting **porous sheet** manuf;
 pulp binder carbon powder fired **sheet**
 IT Phenolic resins, uses
 RL: DEV (Device component use); MOA (Modifier or additive use); PEP
 (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (Bellpearl, binder; manufacture of elec. conductive **porous**
carbon sheets for fuel cell
 moisture controllers)
 IT Vinal fibers
 RL: DEV (Device component use); MOA (Modifier or additive use); PEP
 (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (binders; manufacture of elec. conductive **porous carbon**
sheets for fuel cell moisture controllers)
 IT Films
 Films
 (elec. conductive, **porous**; manufacture of elec. conductive
porous carbon sheets for fuel
cell moisture controllers)
 IT Porous materials
 (films, elec. conductors; manufacture of elec. conductive **porous**
carbon sheets for fuel cell
 moisture controllers)
 IT Electric conductors
 Electric conductors
 (films, **porous**; manufacture of elec. conductive **porous**
carbon sheets for fuel cell
 moisture controllers)
 IT Cellulose pulp
 (manufacture of elec. conductive **porous carbon**
sheets for fuel cell moisture controllers)
 IT **Fuel cells**
 (moisture controller; manufacture of elec. conductive **porous**
carbon sheets for fuel cell
 moisture controllers)
 IT Films
 (porous, elec. conductors; manufacture of elec. conductive **porous**
carbon sheets for fuel cell
 moisture controllers)
 IT 9002-85-1, Poly(vinylidene chloride) 25014-41-9, Polyacrylonitrile
 RL: DEV (Device component use); MOA (Modifier or additive use); PEP
 (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (binder; manufacture of elec. conductive **porous carbon**

- sheets for fuel cell moisture controllers)**
- IT 7440-44-0, **Carbon**, uses 7782-42-5, Graphite, uses
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (manufacture of elec. conductive porous carbon
sheets for fuel cell moisture controllers)
- L71 ANSWER 19 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 1999:533430 HCAPLUS
 DN 131:187310
 TI Fabrication and characteristics of anode-supported tube for solid oxide
fuel cell
 AU Song, Rak-Hyun; Kim, Eung-Yong; Shin, Dong Ryul; Yokokawa, Harumi
 CS Korea Institute of Energy Research, Taejon, 305-343, S. Korea
 SO Proceedings - Electrochemical Society (1999), 99-19(Solid Oxide
 Fuel Cells (SOFC VI)), 845-850
 CODEN: PESODO; ISSN: 0161-6374
 PB Electrochemical Society
 DT Journal
 LA English
 AB As a preliminary experiment for the development of anode-supported tubular cell
 with proper porosity, we have investigated the anode **substrate**
 and the electrolyte-coated anode tube. The anode **substrate** was
 manufactured as a function of carbon content in the range of 20 to 50 volume%.
 As the **carbon** content increased, the **porosity** of the
 anode **substrate** increased slightly and the **carbon**
 content with proper **porosity** was obtained at 30 volume%.
 The anode tube was fabricated by extrusion process and the electrolyte
 layer was coated on the anode tube by slurry dipping process. The
 anode-supported tube was cofired successfully. Their sintered property
 and microstructure were examined. The porosity of the anode tube was 35 %.
 From the gas permeation test, the anode tube was found to be porous enough
 for gas supply. On the other hand, the anode-supported tube with
 electrolyte layer indicated a very low gas permeation rate. This means
 that the coated electrolyte was dense. Based upon these exptl. results,
 we will fabricate and test the anode-supported tubular cell.
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 57, 76
- ST tubular anode supported **fuel cell**; solid oxide
fuel cell anode supported; anode tube YSZ nickel oxide
 extrusion; **carbon pore** former anode tube extrusion;
 electrolyte coated anode tube slurry dipping
- IT **Fuel cell electrolytes**
 (YSZ; fabrication and characteristics of anode-supported tube for solid
 oxide **fuel cell**)
- IT Molding of ceramics
 (extrusion, of anode; fabrication and characteristics of
 anode-supported tube for solid oxide **fuel cell**)
- IT Permeation
 Solid state **fuel cells**
 (fabrication and characteristics of anode-supported tube for solid
 oxide **fuel cell**)
- IT **Fuel cell anodes**
 (nickel oxide-YSZ; fabrication and characteristics of anode-supported
 tube for solid oxide **fuel cell**)
- IT 1313-99-1, Nickel oxide (NiO), uses
 RL: DEV (Device component use); USES (Uses)
 (anode containing YSZ and; fabrication and characteristics of
 anode-supported tube for solid oxide **fuel cell**)

- IT 114168-16-0, Yttrium zirconium oxide (Y0.16Zr0.92O2.08)
 RL: DEV (Device component use); USES (Uses)
 (anode containing nickel oxide and; fabrication and characteristics of anode-supported tube for solid oxide fuel cell)
- IT 1314-23-4, Zirconium oxide (ZrO2), uses
 RL: DEV (Device component use); USES (Uses)
 (yttria-stabilized, anode containing nickel oxide and; fabrication and characteristics of anode-supported tube for solid oxide fuel cell)
- IT 1314-36-9, Yttrium oxide (Y2O3), uses
 RL: DEV (Device component use); USES (Uses)
 (zirconia stabilized with, anode containing nickel oxide and; fabrication and characteristics of anode-supported tube for solid oxide fuel cell)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

- L71 ANSWER 20 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 1998:92163 HCAPLUS
 DN 128:130229
 TI Studies of gas diffusion electrodes for polymer electrolyte fuel cells: effect of polytetrafluoroethylene content on the microstructure of the diffusion layer
 AU Antolini, E.; Giorgi, L.; Pozio, A.
 CS ENEA CRE Casaccia Erg Tea Echi, Rome, 00060, Italy
 SO Materials, Functionality & Design, Proceedings of the European Conference on Advanced Materials and Processes and Applications, 5th, Maastricht, Neth., Apr. 21-23, 1997 (1997), Volume 3, 3/503-3/506.
 Editor(s): Sarton, L. A. J. L.; Zeedijk, H. B. Publisher: Netherlands Society for Materials Science, Zwijndrecht, Neth.
 CODEN: 65PUA8
 DT Conference
 LA English
 AB The following conclusions can be drawn with respect to the influence of the PTFE content on the microstructure in PTFE/C films. Two distinctive pore distributions with boundary of about 0.35 μ m were detected. The overall porosity of samples decreased with increasing PTFE content of the layer. The microporosity of the samples was only attributable to the intra-agglomerate space of carbon particle. The porosity of carbon agglomerates was independent of PTFE amount of the layer. From 10 to 20 wt% PTFE the polymer coated the pores with size higher than 2 μ m, from 20 to 40 wt% PTFE the polymer filled the pores in the range 1 to 2 μ m, above 40 wt% PTFE the only effect of the polymer was to increase the thickness of the layer.
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38
- ST polymer electrolyte fuel cell electrode; PTFE effect
 gas diffusion electrode microstructure
- IT Fluoropolymers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (gas diffusion electrodes for polymer electrolyte fuel cells and effect of PTFE content on the microstructure of the diffusion layer)
- IT Fuel cell electrodes
 Fuel cell electrodes
 (gas diffusion; gas diffusion electrodes for polymer electrolyte fuel cells and effect of PTFE content on the microstructure of the diffusion layer)
- IT 9002-84-0, Polytetrafluoroethylene

RL: TEM (Technical or engineered material use); USES (Uses)
 (gas diffusion electrodes for polymer electrolyte fuel
 cells and effect of PTFE content on the microstructure of the
 diffusion layer)

L71 ANSWER 21 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1997:701632 HCAPLUS

DN 127:310600

TI Porous carbon sheets having improved gas
 permeability and high strength and their manufacture

IN Tajiri, Hiroyuki; Sawara, Tetsuya; Washimi, Takahiro

PA Osaka Gas Co., Ltd., Japan; Unitika Ltd.

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 09278558	A	19971028	JP 1996-113083	19960409 <--
PRAI	JP 1996-113083		19960409 <--		
AB	Porous C sheets useful as electrode materials for fuel cells have porosity 60-80%, average pore diameter 1-20 .mu.m, compressive strength 50-150 kg/cm2 and compressive elastic modulus 100-350 kg/cm2. Sheets containing C fiber 100, organic fiber having residual C ratio after carbonization <40 weight% 20-100 and thermosetting resin having residual C ratio after carbonization ≥50 weight% 50-150 weight parts are laminated, molded under heating, and carbonized or graphitized to obtain the title product.				
IC	ICM C04B038-06				
	ICS C04B035-83; H01M004-96				
CC	57-8 (Ceramics)				
	Section cross-reference(s): 52				
ST	porous carbon sheet fuel cell electrode				
IT	Carbon fibers, uses Phenolic resins, uses Polyester fibers, uses				
	RL: TEM (Technical or engineered material use); USES (Uses) (porous carbon sheets having improved gas permeability and high strength and their manufacture)				
IT	Fuel cell electrodes (porous carbon sheets having improved gas permeability and high strength and their manufacture for)				
IT	Plastics, uses				
	RL: TEM (Technical or engineered material use); USES (Uses) (thermosetting; porous carbon sheets having improved gas permeability and high strength and their manufacture)				
IT	7440-44-0, Carbon, processes				
	RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses) (porous carbon sheets having improved gas permeability and high strength and their manufacture)				

L71 ANSWER 22 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1997:666119 HCAPLUS

DN 127:296276

TI Phosphoric acid fuel cells

IN Nakafuji, Kunihiro; Hirozane, Kenichi; Nishizawa, Nobuyoshi

PA Sanyo Electric Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 09266001	A	19971007	JP 1996-76676	19960329 <--
PRAI	JP 1996-76676		19960329	<--	

AB The fuel cells have a H3PO4 impregnated electrolyte matrix held between a pair of porous electrodes, which are held between a pair of H3PO4 impregnated porous substrates, where the substrates have an average pore diameter smaller than the average diameter of substrates in conventional H3PO4 fuel cell. Preferably the substrates have average pore diameter 0.01-10 μm and porosity 1-60%.

IC ICM H01M008-02

ICS H01M008-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST phosphoric acid fuel cell substrate porosity

IT Fuel cells

(porous carbon substrates with fine pores for phosphoric acid fuel cells)

IT 7440-44-0, Carbon, uses

RL: DEV (Device component use); PRP (Properties); USES (Uses)

(porous carbon substrates with fine pores for phosphoric acid fuel cells)

L71 ANSWER 23 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1997:380487 HCAPLUS

DN 127:37200

TI Carbonaceous porous bodies and their manufacture for fuel-cell electrodes

IN Tajiri, Hiroyuki; Teranishi, Koichi

PA Osaka Gas Co., Ltd., Japan; Unitika Ltd.

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 09110407	A	19970428	JP 1995-269690	19951018 <--
PRAI	JP 1995-269690		19951018	<--	

AB The title carbonaceous bodies have porosity $\geq 60\%$, average pore size 10-30 μm , bending strength $\geq 100 \text{ kg/cm}^2$, and gas permeability 500-1000 $\text{mL}\cdot\text{mm}/\text{cm}^2\cdot\text{h}\cdot\text{mmHg}$. Carbon fibers, organic fibers, and thermosetting resins are mixed and paper-made, laminated, heat- and press-molded to show bulk d. 0.5-1.0 g/cm^3 , and carbonized or graphitized to give the title articles. Resulting electrodes have long life, good voltage characteristics, and high strength.

IC ICM C01B031-02

ICS C04B035-83; C04B038-06; H01M004-88; H01M004-96

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST carbonaceous porous electrode fuel cell;

carbonization fiber electrode fuel cell;

graphitization fiber electrode fuel cell

IT Carbon fibers, processes

RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (Donacarbon S 231; carbonaceous porous electrodes and their
 manufacture from carbon fiber, organic fiber, and
 thermosetting resins for fuel cells)

IT Carbonization

Fuel cell electrodes

Graphitization

(carbonaceous porous electrodes and their manufacture from
 carbon fiber, organic fiber, and thermosetting
 resins for fuel cells)

IT Carbonaceous materials (technological products)

RL: DEV (Device component use); IMF (Industrial manufacture); PREP
 (Preparation); USES (Uses)

(carbonaceous porous electrodes and their manufacture from
 carbon fiber, organic fiber, and thermosetting
 resins for fuel cells)

IT Phenolic resins, processes

Polyester fibers, processes

RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (carbonaceous porous electrodes and their manufacture from
 carbon fiber, organic fiber, and thermosetting
 resins for fuel cells)

IT Polyesters, processes

RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (fiber; carbonaceous porous electrodes and their manufacture from
 carbon fiber, organic fiber, and thermosetting
 resins for fuel cells)

IT 162774-90-5, Bellpearl S 895

RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (carbonaceous porous electrodes and their manufacture from
 carbon fiber, organic fiber, and thermosetting
 resins for fuel cells)

IT 25038-59-9, Polyethylene terephthalate, processes

RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (fiber; carbonaceous porous electrodes and their manufacture from
 carbon fiber, organic fiber, and thermosetting
 resins for fuel cells)

L71 ANSWER 24 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1997:350506 HCAPLUS

DN 127:20917

TI Electrodes for solid polymer electrolyte fuel cells
 and the fuel cells

IN Fukuoka, Hiroko; Uchida, Makoto; Sugawara, Yasushi; Eda, Nobuo

PA Matsushita Electric Industrial Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 09092293	A	19970404	JP 1995-247231	19950926 <--
	JP 3275652	B2	20020415		
PRAI	JP 1995-247231		19950926 <--		

AB The electrodes have a catalyst layer containing a solid polymer electrolyte
 and powdered C loaded with a noble metal catalyst on 1 side of a gas
 diffusion layer, where the catalyst layer has ≥ 0.04 cm³ fine
 pores/g and the pores have diameter 0.04-1.0 μ
 m. The fuel cells have electrodes containing the

porous catalyst layer.

IC ICM H01M004-86
ICS H01M004-88; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST polymer electrolyte fuel cell electrode; fuel cell electrode porous catalyst layer

IT Fuel cell electrodes
(electrodes containing porous polymer-catalyst layer on gas diffusion layer for solid polymer electrolyte fuel cells)

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); USES (Uses)
(fluorine- and sulfo-containing, ionomers; electrodes containing porous Nafion-platinum laden carbon catalyst layer on gas diffusion layer for solid polymer electrolyte fuel cells)

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); USES (Uses)
(fluorine-containing, sulfo-containing, ionomers; electrodes containing porous Nafion-platinum laden carbon catalyst layer on gas diffusion layer for solid polymer electrolyte fuel cells)

IT Fluoropolymers, uses
Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; electrodes containing porous Nafion-platinum laden carbon catalyst layer on gas diffusion layer for solid polymer electrolyte fuel cells)

IT Ionomers
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; electrodes containing porous Nafion-platinum laden carbon catalyst layer on gas diffusion layer for solid polymer electrolyte fuel cells)

IT 7440-06-4, Platinum, uses 7440-44-0, Carbon, uses
RL: CAT (Catalyst use); USES (Uses)
(electrodes containing porous Nafion-platinum laden carbon catalyst layer on gas diffusion layer for solid polymer electrolyte fuel cells)

L71 ANSWER 25 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1995:703807 HCAPLUS

DN 123:90926

TI Preparation of macroporous carbons from phase-inversion membranes

AU Hatori, H.; Yamada, Y.; Shiraishi, M.

CS National Institutes for Resources and Environment, Tsukuba, 305, Japan

SO Journal of Applied Polymer Science (1995), 57(7), 871-6

CODEN: JAPNAB; ISSN: 0021-8995

PB Wiley

DT Journal

LA English

AB Porous carbons were prepared from phase-inversion membranes of a polyimide carbonized at 800° for 1 h in flowing Ar. The membrane film maintained the film form throughout carbonization. The carbon films showed pores with sizes of more than 0.1 μ m, as measured by electron microscopy, mercury porosimetry, and gas-adsorption methods. Micro- and meso-pore structures in the carbon films were not affected by phase inversion and the macro-porous carbons had mol. sieve characteristics similar to those of carbons prepared from nonporous polyimide films. A macroporous structure in cellulose membranes was similarly maintained through the carbonization

step, but some of the carbon materials were fractured or deformed due to shrinkage. Polymer membranes are suitable **porous carbon** precursors if they satisfy 2 requirements: solid-state carbonization and relatively high carbon yield. **Composite** membranes of macro-**porous carbon** can be readily produced by shaping of the precursor polyimide and show selective characteristics suitable for use in electrochem. applications [fuel cell electrodes, separation membranes, etc.].

CC 57-8 (Ceramics)

Section cross-reference(s): 38

ST polyimide precursor **porous carbon** material;
carbonization polyimide shaped carbon **composite**

IT Pore

(macro-porous; preparation of macro-porous carbons by carbonization of polyimide phase-inversion membrane precursors)

IT Carbonization and Coking

(preparation of macro-porous carbons by carbonization of polyimide phase-inversion membrane precursors)

IT Polyimides, processes

RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)

(preparation of macro-porous carbons by carbonization of polyimide phase-inversion membrane precursors)

IT 7440-44-0P, **Carbon**, preparation

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(preparation of macro-**porous** carbons by carbonization of polyimide phase-inversion membrane precursors)

L71 ANSWER 26 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1995:249024 HCAPLUS

DN 122:13791

TI Manufacture of **porous carbon sheets** and
porous carbon electrode materials

IN Haraguchi, Kazutoshi; Furukawa, Masaru; Nomoto, Tatsuya

PA Dainippon Ink & Chemicals, Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 06263558	A	19940920	JP 1993-49263	19930310 <--
PRAI	JP 1993-49263		19930310 <--		

AB **Porous C sheets** are prepared by molding a mixture containing carbon fibers having diameter d 15-30 .mu.m and aspect ratio r 3-30, a binder, and optionally carbon fibers having d 5-14 and r 5-50, hardening, and firing. The **C sheets** have high gas permeability, thermal and elec. conductivity, and bending strength and are used for **fuel cell** electrodes.

IC ICM C04B038-06

ICS C04B035-52; C04B035-80; H01M004-88; H01M004-96

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 57

ST **carbon fiber porous sheet** manuf;
fuel cell electrode carbon fiber; electrode
carbon fiber porous sheet

IT **Carbon** fibers, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical

process); PROC (Process); USES (Uses)
 (preparation of **porous carbon sheets** from
carbon fibers and binders)

IT Carbonaceous materials
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP
 (Preparation); USES (Uses)
 (preparation of **porous carbon sheets** useful
 for **fuel-cell** electrodes)

IT **Electrodes**
 (fuel-cell, preparation of **porous**
carbon sheets useful for **fuel-cell**
 electrodes)

IT 7782-42-5, Graphite, uses
 RL: DEV (Device component use); PEP (Physical, engineering or chemical
 process); PROC (Process); USES (Uses)
 (preparation of **porous carbon sheets** for
fuel cell electrodes)

IT 153190-19-3, Ceradic 4331S
 RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical
 process); PROC (Process); USES (Uses)
 (preparation of **porous carbon sheets** for
fuel cell electrodes)

L71 ANSWER 27 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 1994:11829 HCAPLUS
 DN 120:11829
 TI Manufacture of **porous carbon** electrodes for
fuel cells
 IN Oohashi, Takashi; Omotani, Tsunehisa; Kodama, Kazuhiko; Hamu, Shoji
 PA Oji Paper Co, Japan
 SO Jpn. Kokai Tokkyo Koho, 5 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 05251088	A	19930928	JP 1992-49180	19920306 <--
PRAI	JP 1992-49180		19920306 <--		

AB Powdered phenolic resins, having average particle diameter 10-40 μ
 m, and **pore-forming agents**, having carbonization yield
 $\leq 10\%$ after firing at 900°, are added at 60-100 and 50-230
 weight parts, resp., to 100 wt parts polyacrylonitrile fibers or
 polyacrylonitrile fiber-carbonaceous powder mixture, shaped, hardened,
 infusibilized in air, carbonized at $\geq 800^\circ$ in inert gases,
 and heated at 2200-2800° in inert gases to give title electrodes
 having high bending and compressive strength.

IC ICM H01M004-88
 ICS C04B038-06; D01F009-22; D01F009-24

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST carbon electrode **fuel cell**; polyacrylonitrile fiber
 carbon electrode manuf

IT Phenolic resins, uses
 RL: USES (Uses)
 (carbon electrodes from, polyacrylonitrile fibers in manufacture of, for
 strength, for **fuel cells**)

IT Acrylic fibers, uses
 RL: USES (Uses)
 (in carbon electrode manufacture, for **fuel cells**, for
 strength)

IT **Electrodes**
 (fuel-cell, carbon, manufacture of
 porous, polyacrylonitrile fibers in, for strength)

IT Coke
 RL: USES (Uses)
 (pitch, carbon electrodes from, polyacrylonitrile fibers in manufacture of,
 for strength, for fuel cells)

IT 9003-35-4, Bellpearl S 890
 RL: USES (Uses)
 (carbon electrodes from, polyacrylonitrile fibers in manufacture of, for
 strength, for fuel cells)

IT 9002-88-4, Polyethylene 9002-89-5, Poly(vinyl alcohol) 9011-14-7,
 Poly(methyl methacrylate)
 RL: USES (Uses)
 (pore-forming agent, in carbon electrode manufacture,
 for strength, for fuel cells)

L71 ANSWER 28 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 1993:416907 HCAPLUS
 DN 119:16907
 TI Influence of physicochemical properties on the performance of platinum/
 carbon porous electrodes for oxygen reduction in
 phosphoric acid
 AU Giordano, N.; Passalacqua, E.; Antonucci, P. L.; Pino, L.; Vivaldi, M.;
 Patti, A.; Kinoshita, K.
 CS Inst. Transform. Storage Energy, CNR, S. Lucia, 98126, Italy
 SO Electrochimica Acta (1993), 38(7), 913-18
 CODEN: ELCAAV; ISSN: 0013-4686
 DT Journal
 LA English
 AB The reduction of O₂ on Pt supported on C black in PTFE-bonded porous
 electrodes in 98% H₃PO₄ at 170° was investigated. The influence of
 the Pt surface area and the volume of H₃PO₄ in the electrode
 structure (percentage acid occupation, PAO) on the performance of
 porous electrodes (i.e. current-potential behavior, potential at
 constant c.d. 200 mA/cm², O gain) were evaluated. The results clearly show
 that the Pt surface area has a major influence on the Tafel slope,
 electrode polarization, electrode potential decay at constant c.d., and O
 gain. On the other hand, these parameters do not show a clear trend with
 PAO.

CC 72-2 (Electrochemistry)
 Section cross-reference(s): 52

ST platinum carbon porous electrode performance property;
 oxygen redn phosphoric acid electrode performance

IT Carbon black, uses
 RL: USES (Uses)
 (electrodes from platinum-supported, oxygen reduction in phosphoric acid on
 porous PTFE-bonded)

IT Reduction, electrochemical
 (of oxygen in phosphoric acid on porous PTFE-bonded
 platinum-supported carbon black electrodes)

IT Electric current-potential relationship
 (of platinum-supported porous carbon black bonded
 with PTFE in phosphoric acid)

IT Electrolytic polarization
 (cathodic, in oxygen reduction in phosphoric acid on platinum-supported
 porous carbon black bonded with PTFE)

IT Reduction catalysts
 (electrochem., platinum-supported carbon black, for oxygen in
 phosphoric acid)

IT **Electrodes**
 (fuel-cell, air, platinum-supported carbon
 black porous PTFE-bonded, in phosphoric acid)

IT 7440-06-4, Platinum, uses
 RL: USES (Uses)
 (electrodes from carbon black with support of, oxygen reduction in
 phosphoric acid on porous PTFE-bonded)

IT 9002-84-0, PTFE
 RL: PRP (Properties)
 (electrodes of platinum-supported carbon black bonded with)

IT 7664-38-2, Phosphoric acid, uses
 RL: USES (Uses)
 (oxygen reduction in, physicochem. properties effect on performance of
 platinum/carbon porous electrodes for)

IT 7782-44-7, Oxygen, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (reduction of, on platinum/carbon porous electrodes in
 phosphoric acid, physicochem. properties in relation to)

L71 ANSWER 29 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1993:31298 HCAPLUS

DN 118:31298

TI Prepregs and their manufacture and use in carbon sheets

IN Tajiri, Hiroyuki; Kutoku, Hirobumi; Nakatani, Satoru

PA Osaka Gas Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 04220438	A	19920811	JP 1990-413101	19901220 <--
PRAI	JP 1990-413101		19901220 <--		

AB Title prepregs comprise rubbers 5-40, ≥ 1 powdered carbonaceous material from carbonizable or graphite-forming powders and carbonized or graphitized powders 20-60, carbonizable or graphite-forming binders 10-50, and thermoplastic resins 10-30%, and the prepregs are manufactured by kneading the ingredients and then formed into sheets, molded under pressure, and carbonized or graphitized to give carbon sheets with uniform porosity and mech. strength useful as electrode plates for fuel cells. The prepregs may addnl. contain carbonizable or graphite-forming short fibers or short carbon fibers and thermosetting resins may be used as binder in which case the kneading temperature is set below their curing temperature

Thus, butadiene rubber 20, powdered graphite (average diameter 50 μm) 15, powdered

graphite (diameter 100 μm) 15, powdered graphite (average diameter 150 μm) 15, PL

3820A (phenolic resin) 35, powdered poly(vinyl alc.) 25, Donacarbo S 251 (milled carbon fiber) 20, and Me₂CO 20 parts were kneaded, heated at 80° to remove the Me₂CO, sheeted through two rolls with 2 mm clearance, and wound with polyethylene films placed on both sides. The prepregs were cut into a square (700 + 700 mm), pressed in a mold at 135° and 300 kg/cm² to give a 1 mm-thick sheet, which was fired at 2700° under N to give a graphite sheet with flexural strength 3 kg/cm², porosity 60%, elec. conductivity in thickness direction 2 + 10⁻¹ Ωcm , and average pore size 30 μm with standard deviation 3 μm

IC ICM C08J005-24
ICS B29B011-16; B29B015-08; C01B031-00; C08L021-00; H01M004-96

CC 76-2 (Electric Phenomena)
Section cross-reference(s): 38, 52

ST **carbon sheet porosity** elec conductive;
electrode **fuel cell carbon sheet**

IT Electric conductors
(**carbon sheets, porous, for electrode plates, manufacture of**)

IT Carbon fibers, uses
Phenolic resins, uses
Rubber, butadiene, uses
RL: USES (Uses)
(prepregs containing, for manufacture of **porous carbon sheets**)

IT **Electrodes**
(**fuel-cell, porous carbon sheets for, manufacture of**)

IT 7440-44-0
RL: USES (Uses)
(**carbon fibers, prepregs containing, for manufacture of porous carbon sheets**)

IT 7782-42-5, Graphite, uses 9002-89-5, Poly(vinyl alcohol)
RL: USES (Uses)
(prepregs containing, for manufacture of **porous carbon sheets**)

IT 9003-17-2
RL: USES (Uses)
(rubber, prepregs containing, for manufacture of **porous carbon sheets**)

L71 ANSWER 30 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1991:167793 HCAPLUS

DN 114:167793

TI Plasma spraying of porous electrodes for a planar solid oxide fuel cell

AU Tai, Lone Wen; Lessing, Paul A.

CS New Mexico Inst. Min. Technol., Socorro, NM, 87801, USA

SO Journal of the American Ceramic Society (1991), 74(3), 501-4
CODEN: JACTAW; ISSN: 0002-7820

DT Journal

LA English

AB Porous electrodes of La_{0.85}Sr_{0.15}MnO₃ for planar solid oxide fuel cells were fabricated by the plasma spray technique. Spherical C particles were used as an effective pore former. Spraying a mixture of annealed oxide powders of size 50-200 μm and 15% solid Carbospheres resulted in a uniform coating of 40% porosity. Porous coatings were also obtained when rigid resin intermediates were sprayed followed by annealing at 1000° in air.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **fuel cell electrode plasma spraying; strontium lanthanum manganite electrode fuel cell**

IT Plasma, chemical and physical effects
(in fabrication of porous strontium-doped lanthanum manganite electrodes)

IT **Electrodes**
(**fuel-cell, lanthanum manganite for, strontium-doped, porous, plasma spraying of**)

IT 120605-82-5, Lanthanum manganese strontium oxide (La_{0.85}MnSr_{0.15}O₃)

RL: USES (Uses)
 (electrodes, porous, plasma spraying of, for planar solid oxide
fuel cell)
 IT 7440-44-0, Carbon, uses and miscellaneous
 RL: USES (Uses)
 (microspherical, **pore** formers, in fabrication of porous
 strontium-doped lanthanum manganite electrodes by plasma spraying)

L71 ANSWER 31 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 1989:444306 HCAPLUS
 DN 111:44306
 TI **Porous carbon** products
 IN Hiramoto, Jiro; Takano, Shigeru; Kaneshiro, Tsuneo
 PA Kawasaki Steel Corp., Japan
 SO Jpn. Kokai Tokkyo Koho, 5 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 64003085	A	19890106	JP 1988-67797	19880322 <--
PRAI	JP 1987-66987	A1	19870320	<--	

AB A **porous C** product having a **porosity** 50-85% (with
pore diameter <100 . μ m) is manufactured by mixing
 mesophase C spheres and/or graphitized spheres 10-50, a granular organic
 substance with a residual carbonization ratio <30 weight%, e.g., polyvinyl
 alc.), 10-60 and a binder 10-50 weight%, hot pressing, and firing in an inert
 gas atmospheric The C product has high mech. strength, elec. conductivity,
 and gas permeability, and it is used as **fuel-cell** electrodes.

IC ICM C04B038-06
 CC 57-8 (Ceramics)
 Section cross-reference(s): 52
 ST **porous carbon fuel cell** electrode;
 polyvinyl alc **porous carbon** material
 IT Phenolic resins, uses and miscellaneous
 RL: USES (Uses)
 (in **porous carbon** product manufacture, for **fuel**
-cell electrodes)
 IT Pitch
 (coal-tar, in **porous carbon** product manufacture, for
fuel-cell electrodes)
 IT **Electrodes**
 (**fuel-cell**, **porous carbon**
 materials for, with high strength and conductivity and gas permeability)
 IT 9002-89-5, Polyvinyl alcohol
 RL: USES (Uses)
 (in **porous carbon** product manufacture, for **fuel**
-cell electrodes)
 IT 7440-44-0, Carbon, uses and miscellaneous
 RL: USES (Uses)
 (mesophase, **porous** products from, for **fuel-**
cell electrodes)

L71 ANSWER 32 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 1989:138738 HCAPLUS
 DN 110:138738
 TI Manufacture of **fuel-cell** electrodes
 IN Ueno, Sanji; Segawa, Noboru; Ogami, Taiji

PA Toshiba Corp., Japan
 SO Jpn. Kokai Tokkyo Koho, 3 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63298969	A	19881206	JP 1987-129615	19870528 <--
PRAI	JP 1987-129615		19870528	<--	

AB Anode of H₃PO₄ fuel cells consisting of porous carbon materials bearing catalysts and/or cathode of porous carbon materials bearing catalysts have its porous surface coated with particles of metal phosphates. This improves the wettability of these electrodes with H₃PO₄, increases the volume of retainable H₃PO₄, and increases the operation time of fuel cells. Thus, porous carbon plates were dipped into a suspension of 100 g Si phosphate (.ltorsim.1-μ m diameter) in 1 L water and dried at 100°, and the process was repeated to coat Si phosphate at 5 weight% of the carbon plates. These plates were coated with resp. catalyst layers and used in a fuel cell as electrodes. The cell was operated for 12,000 h without decrease of operating voltage, vs. a gradual decrease after 8,000 h for another cell using uncoated electrodes due to decrease of volume of H₃PO₄ electrolyte.

IC ICM H01M004-86
 ICS H01M008-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST fuel cell electrode wettability; electrode phosphoric acid fuel cell

IT Electrodes
 (fuel-cell, metal phosphate-coated, phosphoric acid)

IT 7784-30-7 10043-83-1 10103-46-5 13765-94-1 13765-95-2, Zirconium phosphate (unspecified) 51404-74-1, Silicon phosphate

RL: USES (Uses)

(electrodes coated with, for phosphoric acid fuel cells)

L71 ANSWER 33 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1989:81422 HCAPLUS

DN 110:81422

TI Porous carbon-fiber sheets for fuel-cell electrodes and filters

IN Mizuki, Tatsuro; Matsumoto, Tadayuki; Takizawa, Tamotsu; Miwa, Kishio

PA Toray Industries, Inc., Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63222080	A	19880914	JP 1987-54589	19870310 <--
PRAI	JP 1987-54589		19870310	<--	

AB The porous carbon-fiber sheets are manufactured by blending carbonizable short fibers, short carbon fibers, and dispersant, shaping, and heating to carbonize. Thus, coal-tar pitch short fibers (diameter 12 .mu.m, average length 10 mm) 39, polyacrylonitrile-based short carbon fibers 39, polyvinyl alc.-vinyl

acetate mixture 2 weight parts and a suitable amount of water were blended, shaped, dried at 80°, hot-pressed at 250° and 8 kg/cm², and heated in N at 1500° for 5 min to give a 0.15 mm-thick porous sheet having porosity 78% d. 0.4 g/cm³, gas permeability (in the thickness direction) 40 mm H₂O/mm, and resistivity (in the thickness direction) 0.1 Ω-cm.

- IC ICM C04B038-00
ICS B01D013-02; B01D039-20; C01B031-04; D01F009-12; D01F009-14;
D01F009-20; D01F009-22; D21H005-18; D21H005-20; H01M004-88
- CC 57-8 (Ceramics)
Section cross-reference(s): 47, 52
- ST porous carbon fiber sheet electrode; filter
porous carbon fiber sheet; pitch fiber carbon
fiber sheet
- IT Filters and Filtration apparatus
(porous carbon-fiber sheets for, manufacture
of)
- IT Carbon fibers, uses and miscellaneous
RL: USES (Uses)
(sheets, porous, manufacture of, for electrodes and
filters)
- IT Pitch
(coal-tar, porous sheets from carbon
fibers and fibers of, for electrodes and filters)
- IT Electrodes
(fuel-cell, porous carbon-fiber
sheets for, manufacture of)
- IT 108-05-4, Vinyl acetate, uses and miscellaneous 9002-89-5, Polyvinyl
alcohol
RL: USES (Uses)
(binder, in porous carbon-fiber sheet
manufacture for electrodes and filters)
- IT 7440-44-0P
RL: PREP (Preparation)
(carbon fibers, sheets, porous, manufacture
of, for electrodes and filters)
- IT 67-56-1, Methanol, uses and miscellaneous 7732-18-5, Water, uses and
miscellaneous
RL: USES (Uses)
(dispersant, in porous carbon-fiber sheet
manufacture for electrodes and filters)

L71 ANSWER 34 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1989:81420 HCAPLUS

DN 110:81420

TI Porous carbon-fiber sheets for fuel
-cell electrodes and filters

IN Mizuki, Tatsuro; Matsumoto, Tadayuki; Takizawa, Tamotsu; Miwa, Kishio

PA Toray Industries, Inc., Japan

SO Jpn. Kokai Tokkyo Koho, 3 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63222079	A	19880914	JP 1987-54588	19870310 <--
PRAI	JP 1987-54588		19870310 <--		

AB The porous carbon-fiber sheets are manufactured
by mixing carbonizable short fibers with a dispersant, shaping, and

heating to carbonize. Thus, coal-tar pitch system short fibers (diameter 10 μm , average length 6 mm) was mixed with water containing poly(vinyl alc.), shaped, dried at 80°, heated to 280° at 5°/min, hot-pressed at 260° and 8 kg/cm², and carbonized in N at 1500° to give a 0.1 mm-thick **porous sheet** having **porosity** 78%, d. 0.4 g/cm³, and resistivity (in the thickness direction) 0.15 $\Omega\text{-cm}$.

IC ICM C04B038-00
ICS B01D013-02; B01D039-20; C01B031-04; D01F009-12; D01F009-14;
D01F009-20; D21H005-18; D21H005-20; H01M004-88

CC 57-8 (Ceramics)
Section cross-reference(s): 47, 52

ST **porous carbon fiber sheet** electrode; filter
porous carbon fiber sheet

IT Filters and Filtration apparatus
(**porous carbon-fiber sheets** for, manufacture of)

IT **Carbon** fibers, uses and miscellaneous
RL: USES (Uses)
(**sheets, porous**, manufacture of, for electrodes and filters)

IT Pitch
(coal-tar, **porous carbon-fiber sheets** from fibers of, for electrodes and filters)

IT **Electrodes**
(**fuel-cell, porous carbon-fiber sheets** for, manufacture of)

IT 9002-89-5, Polyvinyl alcohol
RL: USES (Uses)
(binder, in **porous carbon-fiber sheet** manufacture for electrodes and filters)

IT 7440-44-0P
RL: PREP (Preparation)
(**carbon fibers, sheets, porous**, manufacture of, for electrodes and filters)

IT 67-56-1, Methanol, uses and miscellaneous 7732-18-5, Water, uses and miscellaneous
RL: USES (Uses)
(dispersant, in **porous carbon-fiber sheet** manufacture for electrodes and filters)

L71 ANSWER 35 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1979:499161 HCAPLUS

DN 91:99161

TI Porous electrodes for electrochemical cells

IN Blanchart, Alain Paul Octave; Van Bogaert, Gilbert Jozef Leontine; De Brandt, Constantine; Spaepen, Gustaaf Jozef Frans

PA Electrochemische Energieconversie N. V., Belg.

SO Ger. Offen., 13 pp.

CODEN: GWXXBX

DT Patent

LA German

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 2856262	A1	19790705	DE 1978-2856262	19781227 <--
	DE 2856262	C2	19880428		
	NL 7714464	A	19790702	NL 1977-14464	19771228 <--
	GB 2012100	A	19790718	GB 1978-49695	19781221 <--
	GB 2012100	B	19820707		

JP 54099947	A	19790807	JP 1978-159087	19781221 <--
JP 62007662	B	19870218		
FR 2413796	A1	19790727	FR 1978-36316	19781226 <--
FR 2413796	B1	19850712		
ES 476370	A1	19790416	ES 1978-476370	19781227 <--
BE 873063	A2	19790627	BE 1978-2057514	19781227 <--
SE 7813338	A	19790629	SE 1978-13338	19781227 <--
CH 647098	A5	19841228	CH 1978-13199	19781227 <--
CA 1119659	A1	19820309	CA 1978-318718	19781228 <--
PRAI NL 1977-14464	A	19771228	<--	

AB The title gas-diffusion electrodes have catalytic coatings and are suitable for **fuel cells**. The current collectors are of Ni or steel wire, perforated plates, or expanded metal with a porosity of .apprx.50%. The coating consists of C 90 and PTFE 10% and is applied to a thickness of .apprx. 40 μ m, except in the vicinity of the collector wire it is thinner. The catalytic layer (also 40 μ m) consists of C particles, some of which are pure and some containing Pt 5 and PTFE .apprx.21%. This layer contains .apprx.27 μ g/cm² of Pt. The final layer consists of PTFE (180 . μ m) and has a porosity of 50%. Two such electrodes were used as H electrodes or air electrodes in a H-air **fuel cell** containing 6.6N KOH.

IC C25B011-08

CC 72-2 (Electrochemistry)

ST electrode **fuel cell** catalytic hydrogen; carbon

PTFE platinum porous electrode

IT **Electrodes**

(**fuel-cell**, porous, for hydrogen-air)

IT 7440-02-0, uses and miscellaneous 7440-06-4, uses and miscellaneous

7440-44-0, uses and miscellaneous 7782-42-5, uses and miscellaneous

9002-84-0 12597-69-2, uses and miscellaneous

RL: DEV (Device component use); USES (Uses)

(electrodes containing, catalytic **fuel-cell**)

IT 1333-74-0, uses and miscellaneous

RL: USES (Uses)

(electrodes, **fuel-cell**)

L71 ANSWER 36 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1970:38304 HCAPLUS

DN 72:38304

OREF 72:7034h,7035a

TI Microporous polymer product

IN Grubb, Willard T.; Macur, Robert A.

PA General Electric Co.

SO Ger. Offen., 22 pp.

CODEN: GWXXBX

DT Patent

LA German

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 1925283		19691127	DE 1969-1925283	19690517 <--
	FR 2008947			FR	

PRAI US 19680520 <--

AB Solns. of olefin polymers in waxes, containing 40-90% (based on total solution) waxes, are used to form objects from which the wax is then dissolved, giving a microporous object. Thus, a homogeneous solution was prepared by heating and stirring a 3:7 mixture of polyethylene (I) and paraffin wax and was applied to the gas side of a Ag-activated electrode in the form of a Ni plate to coat and impregnate the electrode. The wax was dissolved from the polymer with n-heptane, giving an electrode with an impregnated,

white, hydrophobic microporous layer on 1 surface. This electrode was used as an air electrode in a half cell vs. a H electrode as a reference electrode in an electrolyte of 13N KOH and 6M MeOH fuel. Voltage at 0 current was 1.08 V and at 40 mA, 0.73 V. A mixture of 14 g microcryst. wax and 6 g powdered I (d. 0.915) was heated to form a homogeneous solution, cast into an 0.06-cm film on a glass plate, cooled to room temperature, placed in n-heptane to dissolve out the wax, and dried 1 hr in air at room temperature, giving a sheet which had an intense white appearance and which absorbed and was penetrated by <2% of light in the visible range. A 1:1 I-wax composition was poured over a foamed Ni with porosity 95%, cooled, and immersed 48 hr in n-heptane to give a microporous piece of I reinforced throughout its volume with Ni fibers. Immersing this object 48 hr in 6N HNO₃ gave a microporous I containing a 3-dimensional network of large pores formed by the removal of the Ni fibers. Microporous comps. were also prepared from polypropylene and poly(2-methyl-1-pentene) and were used to coat the insides of porous carbon beakers used as full cell electrodes. This method is simple and gives products with extremely high diffuse reflectance.

IC C08F
CC 77 (Electrochemistry)
ST polymer air electrode; olefin polymer air electrode; electrode air electrode; electrode air microporous; silver electrode air microporous; methanol fuel cell; fuel cell methanol
IT Fuel cells
(electrodes, coated and impregnated with olefin polymers, for microporosity)
IT Electrodes
(fuel-cell, coated and impregnated with olefin polymers, for microporosity)
IT Coating materials
(olefin polymer, on electrodes for microporous surface)
IT 9002-88-4, uses and miscellaneous 9003-07-0, uses and miscellaneous 26655-13-0
RL: USES (Uses)
(coating with, of fuel-cell electrodes, for microporosity)

L71 ANSWER 37 OF 37 HCAPLUS COPYRIGHT 2007 ACS on STN
AN 1966:25084 HCAPLUS
DN 64:25084
QREF 64:4600g-h,4601a
TI Spinel-based catalytically active fuel cell electrode
IN Kordes, Karl; Kronenberg, Marvin L.
PA Union Carbide Corp.
SO 5 pp.
DT Patent
LA Unavailable

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 1400998		19650528	FR 1964-981835	19640716 <--
	BE 650517			BE	
PRAI	US		19630718	<--	

AB A porous H or O electrode having catalytic properties and elevated c.d.s. was prepared by incorporating in a porous carbon base a salt of a heavy metal and one of Al with minor amts. of RuCl₃, heating the electrode to about 800° in steam, cooling, and activating the electrode in a H atmospheric For example, a porous C plate of 6.4 mm.

thickness was impregnated in a catalytic solution obtained by mixing equal volume parts of 0.01N RuCl₃, 0.2N Al-(NO₃)₃, and 0.1N Co(NO₃)₂. The impregnated electrode is then heated to 800° in steam and maintained there for 25 min., and then cooled to ambient temperature. The catalyst concentration in the electrode is about 0.1 weight % of Al-Co spinel and about 0.5 mg./cm.² of Ru. The electrode is rendered catalytically active in a H atmospheric and rendered impermeable to the electrolyte, by dipping it in a 3 weight % solution of paraffin in petroleum ether. As a cathode in a H-O fuel cell using a 12N KOH electrolyte, the electrode functioned for 6000 h. at 538 amp./m.² while competitive cathodes were operable for only 2000 h. This electrode was capable of producing 3230 amp./m.² at 0.85 v. as opposed to 1076 amp./m.² for other electrodes. Short-circuit current was 2.16 amp./cm.²

IC H01M
 CC 15 (Electrochemistry)
 IT Spinel
 (catalysts from Al salts and, for fuel cell electrode)
 IT Electrodes
 (fuel-cell, from H C impregnated with mixture of Al salts and spinels)
 IT Alkali metal oxides
 (manufacture of, electrolytic)
 IT Rare earth nitrates
 (fuel cell electrodes (catalytic) from Al salts, RuCl₃ and)
 IT Platinum nitrate
 Vanadium nitrate
 (fuel cell electrodes from Al salts, RuCl₃ and, catalytic)
 IT 7440-05-3, Palladium
 (catalysts, for C-graphite electrodes)
 IT 13138-45-9, Nickel nitrate
 (electrodes (fuel cell) from Al salts, RuCl₃ and, catalytic)
 IT 10141-05-6, Cobalt nitrate, Co(NO₃)₂
 (fuel cell electrode from Al salts, RuCl₃ and, catalytic)
 IT 13548-38-4, Chromium nitrate
 (fuel cell electrodes from Al salt, RuCl₃ and, catalytic)
 IT 3251-23-8, Copper nitrate 7761-88-8, Silver nitrate 10377-66-9,
 Manganese nitrate 13464-77-2, Gold nitrate 13823-29-5, Thorium nitrate
 13860-02-1, Titanium nitrate 15905-86-9, Uranium nitrate
 (fuel cell electrodes from Al salts, RuCl₃ and, catalytic)
 IT 13473-90-0, Aluminum nitrate
 (fuel cell electrodes from spinels, RuCl₃ and, catalytic)
 IT 10049-08-8, Ruthenium chloride, RuCl₃
 (fuel cell electrodes of Al salts and spinels containing, catalytic)

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